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ELEMENTS

OF

LOGICK.

BY

JOHN ANDREWS, D. D.

LATE VICE-PROVOST
OF THE UNIVERSITY OF PENNSYLVANIA.

THE FIFTH EDITION.

Quicquid præcipies, esto brevis; ut cito dicta
Percipiant animi dociles, teneantque fideles.
Omne supervacuum pleno de pectore manat.

PHILADELPHIA:

PRINTED AND PUBLISHED BY R. H. SMALL,

No. 165, Chesnut Street.

1825.

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PREFACE.

OF the few treatises of LOGICK which the author of the following compilation has perused, DUNCAN'S has always appeared to him to be the best. But this treatise, however excellent, is for the most part too diffusive, and in some places, perhaps, even too scientific, for the use of young beginners; at the same time that it omits a number of particulars, of which (as they are generally taught in the schools, and occasionally alluded to in conversation as well as books) a teacher would not wish his pupils to be wholly ignorant. To obviate

these objections, and yet retain as much as possible the features of DUNCAN, is the aim of the present compend; which was composed some years ago, and is now printed, that the classes, for whose use it was intended, may no longer have the trouble of transcribing it.

ELEMENTS

OF

LOGICK.

LOGICK is that science which explains the operations of the human understanding, in acquiring and communicating knowledge. And as these have been usually stated to be four,—APPREHENDING, JUDGING, REASONING, and ARRANGING OUR THOUGHTS in a suitable manner; so Logick, which treats of these operations, is usually divided into four parts.

PART I.

Of Simple Apprehension.

SIMPLE apprehension being that operation of the mind by which it is furnished with ideas, a treatise on it, is, in a great measure, a treatise on ideas, and on the procedure of the mind with respect to them: and it is also a treatise on words and definitions; because, without these, we should often be at a loss both in acquiring and communicating our ideas. The first part, therefore, of Logick, may be divided into two chapters: one, treating of ideas; and the other, of terms and definitions.

CHAPTER I.

Of simple Apprehension, and the faculties by which it is exerted.—Of Ideas, or the first principles of knowledge.—Of the sources from which they are derived; and of the different sorts of them.

Simple Apprehension is that operation of the understanding by which it attends to, and notices, the several objects that are presented to it. It is called *simple* apprehension, because it is employed in the *mere* apprehending or noticing of things; without comparing them with each other, or assigning to them any attributes; which is the province of judgment. And by this operation it is, that the mind, as we have already observed, is

furnished with ideas: for without previously attending to, and noticing, the objects that are presented to it, it is impossible that the mind should ever have any ideas of them; or, in other words, be able to represent to itself the appearances which they exhibit.

In performing this operation, two faculties are made use of, which are quite distinct from each other; SENSATION, and CONSCIOUSNESS. If the object occurring be an external thing, the mind perceives it, and its qualities, by means of the senses; and the power of doing this is called THE FACULTY OF SENSATION: if it be an internal thing, that is, if it be any operation or emotion of the mind, the mind attends to and notices it, without making use, so far as we know, of any bodily organ: and it is this power, which we call THE FACULTY OF CONSCIOUSNESS.

The term IDEA is derived from the Greek word Ειδω, *I see:* and by ideas are meant, the *views* which the mind takes of things, when they are no longer present. In the language of the schools, ideas are the types or resemblances of things; and things themselves are the archetypes, or originals of which the resemblances are made. When an external object is present, and attended to by my mind, I am said to PERCEIVE it; and when my mind is engaged in any operation, or agitated by any passion or emotion, I am said to be CONSCIOUS of that operation, or of that passion or emotion: but when the external object is no longer present, so as to affect the organs of sense, or when the operation which had engaged my mind has ceased to engage it, or the passion or emotion by which I was agitated, now agitates me no more, I am capable of thinking of the object which I before perceived, or of the operation or emotion of which

I was conscious, and of representing to myself the appearances which they respectively exhibited; and when I do so, I am said to have IDEAS of them.

It has been stated, that all external things and their qualities are noticed by means of the senses: and internal things, that is, the operations and emotions of the mind, by consciousness: now all the objects of which we have any knowledge, are either external things and their qualities, or the operations and emotions of the mind: and, consequently, all our ideas, how numerous soever they may be, are derived from these two sources.

As ideas are the first elements of all our knowledge; so sensation and consciousness are the first of our intellectual faculties which are exerted by us. And as we can have no ideas of the operations of our

minds until these operations are exerted; and as they cannot be exerted, before the mind is furnished with ideas of external things about which to employ them; the ideas which give the first employment to our faculties, are evidently the ideas of external things, communicated by the senses: whence it is plain, that all our knowledge must begin in sensation; and that the operation of this faculty is prior even to that of consciousness.

Ideas are either SIMPLE or COMPLEX. A simple idea is an idea of a simple object; that is, an object without parts; or it may be defined, an idea which cannot be resolved into two or more ideas. A complex idea is an idea of a complex object; that is, of an object that consists of parts: or, it is an idea, that may be resolved into two or more ideas.

To the former of these classes belong all our ideas of qualities, and of the operations and emotions of our own minds. The qualities of external things are called SENSIBLE QUALITIES; and may be reduced to five general heads, according to the several senses which are affected by them. Light and colours are perceived by the eye: sounds, by the ear: tastes, by the tongue; smells, by the nose; and heat and cold, roughness and smoothness, hardness and softness, &c. by the touch. Extension, figure, rest, and motion, we perceive by two senses; seeing, and feeling. To which may be added, that our ideas of pleasure and pain, of power, existence, unity, and succession, are conveyed into our understandings both by sensation and consciousness; that is, both by the action of objects around us, and the consciousness of what we feel within. Other qualities are INTELLECTUAL, MORAL, &c.

To this general view of our simple ideas may be subjoined the *two* following *observations*. The *first* is, that simple ideas can only be conveyed into the mind by the proper channels and avenues provided by nature; insomuch that if we are destitute of any of those inlets, all the ideas, thence arising, are absolutely lost to us; nor can we, by any quickness of understanding, find a remedy for this want. A man born blind is incapable of ideas of light and colours; as one, who is born deaf, can form no conception of sounds. And hence it appears, that these our simple ideas are just such as nature furnishes them, and have no dependence on our will: we can neither destroy them when in the understanding; nor fashion or invent any new one, not taken in by the ordinary means of apprehension. So that the utmost bounds of human knowledge cannot exceed the limits of our simple ideas and their various combina-

tions. The *second* is, that though the mind, in multiplying its conceptions, can avail itself of no other materials than those which are furnished by sensation and consciousness: yet, as it has a power of combining these materials in a great variety of ways, it finds itself in possession of an inexhaustible treasure of ideas, sufficient to employ it to the full extent of its powers.

Complex ideas are of two sorts: THOSE WHICH ARE CONVEYED INTO THE MIND BY THINGS REALLY EXISTING IN NATURE; AND THOSE WHICH ARE THE WORKMANSHIP OF THE MIND ITSELF.

Things really existing in nature are all comprised under the general name of SUBSTANCES; which are either material or immaterial. And the usual definition of a substance is, that it is a thing which subsists of itself, without dependence upon any created

being, and is the subject of MODES.* The idea, for example, of a material substance includes in it the idea of a thing subsisting of itself; and the ideas of its *qualities*, by which only, as we find by experience, it is made known to us: the idea of an immaterial substance, in like manner, includes the idea of a thing subsisting of itself; and the ideas of its *operations*, by which only, as we also find by experience, it is made known to us. And hence it appears that it is not without reason, that all our ideas of substances are considered as complex ideas.

Modes are divided into ESSENTIAL and ACCIDENTAL. An essential mode is that which cannot be separated from its subject, without destroying the nature of the subject: an accidental mode is that which may

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* That is, of qualities or attributes.

be separated from its subject, and the nature of its subject remain the same as it was before. Roundness, for example, is an essential mode of a ball; because a thing cannot be a ball without being round; but any particular colour is an accidental mode of a ball; because if a ball, which is now blue, were to be painted white, it would still be a ball as much as ever.

Essential modes are divided into PRIMARY and SECONDARY. A primary essential mode is that which is derived from no other mode, and constitutes a thing what it is. A secondary essential mode is that, which, although inseparable from its subject, is derived from some other mode. Thus roundness is a primary essential mode of a ball; because we do not conceive of it as derived from any other quality of a ball; but volubility, or aptness to roll, is a secondary essential mode of a ball; because

it arises from another quality of it, that is, its roundness. The primary essential mode has been called DIFFERENTIA, or the difference; the secondary essential mode, PROPRIUM, or a property; and the accidental mode, ACCIDENS.

Complex ideas, which are the workmanship of the mind, are divided into COMPOUND—UNIVERSAL, GENERAL, OF ABSTRACT —and RELATIVE.

Compound ideas are those, which the mind forms by putting two or more ideas together. These combinations are sometimes made by adding the *same* idea to itself: thus, by adding the idea of unity to itself repeatedly, and retaining the several amounts in our minds, we come by all the different combinations of numbers: in the same way are formed the different ideas of yards, perches, furlongs, miles, leagues, &c; also

those of weeks, months, years, &c. But, more frequently, our compound ideas are formed by combining ideas of a *different* kind together. The composer of music, for example, forms the idea of a tune which he is composing, and the mechanic, the idea of a machine which he is projecting,—by bringing together, in the former case, a number of notes—and, in the latter, of parts that are different from each other.

An abstract, universal, or, as it is more commonly called, a general idea, is an idea that will apply to several individuals, or to several classes of individuals. If it apply to individuals only, the class which corresponds to it, and comprehends individuals, is termed a SPECIES; if to several classes of individuals, the class which corresponds to it, and comprehends these several classes of individuals, is termed a GENUS. The formation of these ideas depends on a

power which the mind possesses of removing, from its idea of any object, what is peculiar to that object; from its idea of an individual, whatever is peculiar to that individual; and from its idea of a species, whatever is peculiar to that species: a power, which, by the writers on the human mind, is called THE FACULTY OF ABSTRACTION. And hence it appears, that it is not without reason, that our general ideas are ranked among those which are the workmanship of the mind, and have nothing in nature to which they correspond.

But that this may be better understood, it will be worth while to take a more distinct view of the process of the understanding in the formation of these ideas. All the things in nature are *individual* things: that is, every thing is itself, and one; and not another, and more that one. But when we come to take a view of the several indivi-

duals, and observe that a number of them resemble each other in one or more particulars of importance, selecting the particulars in which they agree, and removing all those in which they disagree, we frame to ourselves a general idea applicable to several individuals; that is, to a particular species. Thus certain animals being found to resemble each other in having an erect form, and in being endowed with the faculties of reason and speech, we take these important particulars which are common to them all, and excluding what is peculiar to each, we form a general idea, to which we give the name of *man;* and this name belongs equally to every individual who is possessed of the form and faculties above mentioned. This is the first step or gradation in the forming of abstract ideas, when the mind confines itself to the consideration of individuals, and frames an idea that comprehends such only under it.

Again: having ranged things into species, according to the resemblance found among them, we begin to compare the several species with each other; and often observe, in these also, a resemblance, in one or more particulars of importance. Upon this, throwing out all the particulars in which they disagree, and retaining those only, in which there is a resemblance, we frame a still more general idea, comprehending under it several species. Thus, a sparrow, a hawk, an eagle, &c. are distinct species of birds: they nevertheless resemble each other in being covered with feathers, and provided with wings which bear them through the air: out of these particulars we form a new idea, and appropriating to it the name *bird*, mark by that word a higher class, which comprehends in it all the former This higher class, which extends to several species of things, is called a genus; and is the second step

which the mind takes in the formation of its general ideas.

But, in rising from particulars to generals, the mind does not confine itself to one or two gradations. For when we have reduced things into species, and these again into genera, these genera are often found to resemble each other in some particulars, which being combined together into one idea, includes a new and more comprehensive class of things. Thus bird is a genus, comprehending the several species of sparrow, hawk, eagle, &c.: fish is a genus, including the several species of living creatures which inhabit the waters, as dolphins, sturgeons, &c.: beast or quadruped, and insect, are also genera, which extend to many species: yet all these different genera have this in common, that they are provided with organical bodies fitted for the purposes of life and spontaneous motion. An idea,

therefore made up of these particulars only, will comprehend all the genera above mentioned; and the word, *animal*, by which it is expressed, denotes a higher genus, including the several creatures endued with life, sense, and spontaneous motion.

Further: all things, animate and inanimate, resemble each other in this respect, that they are created; whence we refer them to a genus still higher, which may be called *creature:* a name, which belongs equally to every genus and species of created things, and to each individual thing that is created.

And further still: all things, whatever, exist, or are; and in this respect are said to resemble each other; in which view we refer them to a genus still higher, called *Being*, which is the highest possible genus.

In a series of genera, rising in this manner one above another, each successive genus is called, in the schools, a GENUS GENERALIUS, or HIGHER GENUS; and the genus by which each series is terminated, they distinguish by the name of GENUS GENERALISSIMUM. In like manner, the several genera, comprehended under a higher genus, are, in respect to it, considered as species; and as these have also species under them, the inferior divisions, are, for the sake of distinction termed SPECIES SPECIALIORES, or LOWER SPECIES. And the lowest subdivisions of all, comprehending only individuals, (which, as has been already mentioned, constitute the proper species) are, in respect to the series, denominated the SPECIES SPECIALISSIMÆ. All that lie between these and the highest distribution of things, or genus generalissimum, are the INTERMEDIATE GENERA AND SPECIES; which

are termed successively genus generalius, or species specialior, according as we consider them in the ascending, or descending series of our ideas; or, to speak in the language of logicians, according to their ascent, or descent, in the *linea prædicamentali.*

And here we may take occasion to mention merely, that, by the ancient writers of logick, a genus generalissimum, with all its divisions and subdivisions, was termed a CATEGORY, or PREDICAMENT. And as Aristotle fancied, that all things in nature might be reduced to *ten* general heads, or classes, namely, *substance, quantity, quality, relation, action, passion, place, time, situation,* and *clothing;* these have been called THE TEN CATEGORIES.

It is of more importance to remark, that, though many of our general ideas are

evidently combinations of different simple ideas, and in that view of them are included in the class of compound ideas, we are carefully to distinguish between an idea as it is compound, and as it is general or universal.

An idea is termed compound, with respect to the several ideas which are combined in it; general or universal, with respect to the individuals, species, or genera, to which it extends. Thus, the idea of a bird, considered as a compound idea, includes life, sense, spontaneous motion, a covering of wings, feathers, &c.: but, as a general idea, it denotes the several species of the feathered creation, the hawk, the eagle, the lark, &c.; to all which it extends with equal propriety. In the former case, the several parts of the compound idea are called its COMPREHENSION; in the latter, the genera, the species, and the individuals,

to which the universal idea may be applied, are called its EXTENSION.

The third and last division, of those complex ideas which are the workmanship of the mind, consists of our relative ideas. A relative idea, is an idea which arises from the comparing of things, one with another, and observing their correspondencies. For the mind is not limited to the consideration of objects, as they are in themselves merely: but can examine them as connected with other things brought into view at the same time. And when it does so, and thence acquires new ideas, the ideas thus acquired are called relative ideas; and make, as is supposed, the largest class of our ideas. For every single object will admit of almost innumerable comparisons with others, and, in this way, may become a very plentiful source of ideas to the understanding. Thus, if we compare one

thing with another in respect to bulk, we get the idea of *greater* and *less*, or of *equality:* if, in respect of time, of *older* and *younger:* and so of other relations, which we can pursue at pleasure, and almost without end.

So much, with respect to ideas; which are the subject of the first chapter. We have stated, that all our simple ideas are conveyed into the understanding either by sensation or consciousness; and are the materials out of which all others are formed: that the mind, though it has no power over these, either to fashion or to destroy them, can yet combine them in an infinite number of ways; and that from their various combinations result all our complex ideas: that these complex ideas are of two principal kinds; first, such as are derived from without, and represent those combinations of simple ideas that have a real existence in

nature,—of which sort are all our ideas of substances; secondly, such as are formed by the mind itself, arbitrarily uniting and putting together its ideas: and that, as these last make by far the largest class, and comprehend all those ideas which may be properly termed our own, as being the workmanship of the understanding: so they fall very naturally under three distinct heads. For either the mind combines several simple ideas together in order to form them into one complex idea, in which the number and quality of the ideas united are principally considered; in which way we become possessed of all our compound ideas: or it fixes upon any one of its ideas, whether it be a simple or compound idea, or an idea of a substance, and leaving out the circumstances of time, place, real existence, and whatever renders it particular, considers what it has in common with others, and of that makes an idea which will apply to all

of a kind; whence our abstract or universal ideas are derived: or, lastly, it compares things one with another, examines their mutual connexions, and thereby furnishes itself with a new set of ideas, known by the name of relative ideas; which, as has been already remarked, make by no means the least important class of our ideas.

CHAPTER II.

Of Terms and Definitions.

HAVING seen, in the preceding chapter, how our ideas are acquired; let us now proceed to examine how they are communicated. Ideas themselves are not visible, nor can they be perceived by any outward sense. But God, designing us for society, and to have fellowship with those of our kind, has provided us with organs fitted to frame articulate sounds, and given us also a capacity of using those sounds, or TERMS, as signs of ideas. Hence our ideas, which otherwise must have been locked up, as it were, in our own breasts, are brought forth and made to appear. For, any number of

men having agreed to make use of the same sounds as signs of the same ideas, it is evident, that the repetition of these sounds must excite the same ideas in them all. When, for instance, any train of ideas takes possession of my mind, if the terms, or sounds, by which I am wont to express them, have been annexed, by those with whom I converse, to the very same set of ideas, nothing is more evident, than that by repeating those terms, according to the tenour of my ideas, I shall raise in their minds the same train that has taken possession of my own. Hence, by barely attending to what passes within themselves, they will also become acquainted with the ideas in my understanding, and have them in a manner exposed to their view.

So that we here clearly perceive how a man may communicate his sentiments to another, provided the language, in which he

converses, be copious enough to contain words, appropriated to all his ideas; and provided the person to whom he speaks, is possessed of the same ideas which he expresses, and has been accustomed to connect them with the same terms.

But as this is not always the case, and as we may often have occasion to communicate to others a new idea, that is, an idea that has never yet entered their minds, and which consequently they cannot as yet have connected with any term; it may be asked, by what means it is possible that the communication of such an idea should be effected?

This appears to be a difficulty: and, to solve it, it will be necessary to observe, first, that no word can be to any man the sign of an idea, till that idea comes to have a real existence in his mind. For words

being only so far intelligible, as they denote known ideas; where they have none such to answer to them, there they are plainly sounds without signification, and of course convey no information. But no sooner are the ideas, to which they belong, produced in the understanding, than, finding it easy to connect them with the established words, we can join in any agreement of this kind made by others, and enjoy the benefit of their discoveries. The first thing, therefore, to be considered, is, how these ideas may be conveyed into the mind, that, they being there, we may learn to connect them with the appropriated sounds, and so become capable of understanding others when they make use of these sounds in laying open and communicating their thoughts.—Now, to comprehend distinctly how this may be done, it will be necessary to call to mind the before mentioned divisions of our ideas into simple and complex. And first,

as to our simple ideas, it has been already observed, that they can find no admission into the mind, but by the original fountains of knowledge, sensation, and consciousness. If therefore any of these have as yet no being in the understanding, it will be impossible by words to excite them there. A man, who had never felt the impression of heat, could not be brought to comprehend that sensation, by any thing which we could say to explain it. If we would produce the idea in him, it must be by applying the proper object to his senses, and bringing him within the influence of a hot body. When this is done, and experience has taught him the sensation, to which men have annexed the name *heat*, this term may then become to him the sign of that idea; and he is thenceforth capable of understanding the meaning of the term; which, before, all the words in the world would not have been sufficient to convey into his mind. The

case is the same with respect to light and colours: a man born blind, and by this misfortune destitute of the only conveyance for the ideas of these objects, can never be brought to understand the terms by which they are expressed. The reason is plain: they stand for ideas which have no existence in his mind: and as the organ, appropriated to their reception, is wanting, all other contrivances are vain, nor can these ideas, by any force of description, be excited in him. But, with our complex ideas, it is quite otherwise. For, these being no other than certain combinations of simple ideas put together in various forms, if the simple ideas, out of which the complex ideas are made, have already got admission into the understanding, and the terms serving to express them be known, it will be easy, by enumerating the several ideas included in the combination, and marking the order and manner in which they are united, to

raise any complex idea in the mind. Thus the idea answering to the term, *rainbow*, may be readily excited in the imagination of another, who has never seen the appearance itself, by describing the figure, size, position, and order of colours; if we suppose these several simple ideas, with their names, sufficiently known to him.

The answer, then, to the question proposed above, is now sufficiently obvious.—If the new idea, which we wish to communicate to others, be a simple idea, there is no other way than to refer them to those objects in nature whence the idea is to be obtained: but, if it be a complex idea, its meaning may be explained by enumerating the ideas included in it; that is, by defining it.

And here we see the nature and use of DEFINITIONS. They are used to unfold a

complex idea; and two things are required in them: first, that all the simple ideas, out of which the complex one is formed, be distinctly enumerated; and secondly, that the order and manner of combining them be clearly explained. Where a definition has these requisites, nothing is wanting to its perfection; because every one who reads it, and understands the terms, seeing at once what ideas he is to join together, and also in what mannner, he can, at pleasure, form, in his own mind, the complex idea answering to the term defined.

But this rule, though it extends to all possible cases, and is indeed that alone to which we can have recourse where any doubt or difficulty arises, it is not, however, necessary, or even expedient, to practise in every particular instance. Many of our ideas are extremely complex; and, of course, to enumerate all the simple ideas,

out of which they are formed, would be a very troublesome and tedious work. For which reason, logicians have established a certain compendious mode of defining; of which, it may not be amiss to give here a short account. If the thing to be defined be a species, they give the NEAREST GENUS and the SPECIFIC DIFFERENCE; or, in other words, they refer it to its nearest genus, and then add those circumstances that make the species, which they are defining, to differ from every other species belonging to that genus. For, as the idea of a genus is formed by dropping what is peculiar to each of the several species referred to it, and retaining those particulars which they all possess in common; so, on the other hand, by adding to the genus what is peculiar to any one of the species included in it, we form an adequate idea, and give a complete definition, of that species. In like manner, if the thing to be defined be an individual,

the logical definition will consist of THE SPECIES and the NUMERICAL DIFFERENCE; or, in other words, of the species, and those particulars that distinguish the individual which we are defining, from every other individual belonging to that species. For, as the idea of a species is formed by dropping what is peculiar to the several individuals referred to it, and retaining those particulars only which they possess in common; so, by adding to the species what is peculiar to any one of the individuals included in it, we form an adequate idea, and give a complete definition, of that individual.

We shall conclude with observing, that definitions have been distinguished into two kinds; the DEFINITION OF THE NAME, and the DEFINITION OF THE THING. When the term to be defined, refers to the idea of the writer or speaker, and the definition is de-

signed to show what idea *he* connects with a certain term, it is a definition of the *name*. And such definitions are said to be arbitrary; because, as words are not natural, but merely artificial, signs of ideas, every man is at liberty to annex to a term what idea he pleases. But where the reader, or hearer, is supposed to know that a certain term is connected with a particular idea, and where the design of the definition is to unfold that idea, that the nature of the thing of which it is the type or resemblance, may be fully understood, it is a definition of the *thing*. And such a definition is not arbitrary: because the idea of any thing should be conformable to that thing; and the definition conformable to the idea.

PART II.

Of Judgment.

All our knowledge may be reduced to two heads: our ideas of things, and the judgments which we form with respect to them. Of our ideas, and of terms and definitions by which they are communicated, we have already treated. We come now to speak of our JUDGMENTS; and of PROPOSITIONS, by which they are communicated. And here it will be proper to consider, first, the several grounds of human judgment; and, secondly, the different sorts of propositions.

CHAPTER I.

Of the GROUNDS *of Human Judgment; or, in other words, of* THE DIFFERENT SORTS OF EVIDENCE.

JUDGMENT is that operation of the mind by which we compare two or more ideas together, with a view to determine whether they agree or disagree. But although, in every act of judgment, it is necessary to bring two or more ideas together, and place them, as it were, over against each other; yet, the mere comparing of two ideas together is not the evidence of their agreement or disagreement. What then, it may be asked, is this evidence? Or rather, (as one sort of truth is supported by one sort of evi-

dence, and another by another), What are the different sorts of evidence?

To assist us in judging of this subject, it will be necessary to observe, that all the objects of the human understanding are, either *abstract notions of quantity and number*, or *things really existing*. Of the relations of these abstract notions, all our knowledge is certain; being founded on mathematical evidence. Of things really existing, we judge, either from our own experience, or from the experience of other men. Judging of real existence from our own experience, we attain either *certainty* or *probability*. Our knowledge of real things is certain, when supported by the evidence of external sense, consciousness, and memory; and when from effects we infer causes. Our knowledge of real things is probable, when from facts whereof we have had experience, we infer facts of the same, or a

similar kind, not experienced. Judging of real existence from the experience of other men, we have the evidence of their testimony. And thus it appears, that *all sorts of evidence*, productive of real knowledge, *may be reduced to seven.*—1. *Mathematical evidence.* 2. The evidence *of external sense.* 3. The evidence *of consciousness.* 4. The evidence *of memory.* 5. That evidence which we have, when *from effects we infer causes.* 6. The evidence *of testimony.* 7. *Probable* evidence.

Of MATHEMATICAL EVIDENCE there are two sorts: *intuitive* and *demonstrative*—Mathematical evidence is intuitive, when, from the very nature of the ideas compared, it appears, at first view, that they must necessarily agree or disagree. Mathematical demonstrative evidence is *direct* or *indirect.* When a conclusion is inferred from principles which render it necessarily true,

the demonstration is direct. When, by supposing a given proposition false, we are necessarily led into an absurdity, it is called indirect, apagogical, or *ducens in absurdum.* Now that must be true, which we cannot, without absurdity, suppose to be false. And therefore both sorts of demonstration are equally good, because equally productive of absolute certainty.

All mathematical proof is founded upon axioms, or self-evident propositions, *the contraries of which are inconceivable.* And this sort of proof seems to be peculiar to the sciences that treat of quantity and number; and therefore, in no other science is the mathematical method of proof to be expected. For, in the other sciences, in most of them at least, truth and its contrary are equally conceivable. That Julius Cæsar died a natural death is as easy to be conceived, as that he was murdered in the senate-house.

I feel a hard body, I do not feel a hard body. I see a white colour, I do not see a white colour, are all equally conceivable; and yet may be either true or false according to circumstances. We may conceive that the sun, after setting to-night, will never appear again, or that any particular man will never die: and yet we consider death as what must inevitably happen to every man, and the rising of the sun to-morrow as so certain, that no rational being can doubt of it. Though, therefore, the mathematical method of proof is to be found in the mathematical sciences only, yet satisfactory proof may be found in any other science: and is actually found, in every part of knowledge that deserves the name of science.

The EVIDENCE OF EXTERNAL SENSE, no less than mathematical evidence, produces absolute certainty; though in another way.

Our perception of external things is attended with an irresistible belief, that they exist, and are what they appear to be. When I see a man or a horse, I can no more doubt of his existence, than of my own; and my own I believe with as full assurance as that two and two are four. The existence of body is a self-evident fact. It needs no proof; for to disbelieve or doubt of it, is impossible: and it admits of none; because we know of nothing more evident to prove it by.

The EVIDENCE OF INETRNAL SENSE, or CONSCIOUSNESS, does also produce absolute certainty. That we have within us a thinking and active principle, called a *soul* or *mind;* which is the same thing to-day as it was yesterday; is conscious of its own thoughts; and exercises a variety of faculties different in their objects and manner of operation; are all of them suggestions of

internal sense or consciousness, which we believe because we feel them to be true; and which if we were not to believe, would bring on us the charge of irrationality.

The EVIDENCE OF MEMORY does also produce absolute certainty. A child believes, without any doubt, that, what he remembers distinctly to have seen or heard, he really did see or hear. And he believes this, not because he has been told that he may safely trust his memory; but because the law of his nature determines him, of his own accord, to believe his memory as well as his senses. Indeed if we were to distrust our memory, or treat it as a fallacious faculty, our senses would be of little use to us, and we should be incapable both of knowledge and experience, and also of reasoning; for we cannot be satisfied with a proof, unless we remember the steps of it, and believe that on that remembrance we

may depend. Thoughts remembered may decay through length of time, and at last vanish; but, of an event or object, that part which we distinctly remember, we believe to have been real. We may forget the whole subject of a book, and yet remember and consequently believe, that we read it. We may forget the proofs of a proposition, and yet remember that it was formerly proved to our satisfaction, and acquiesce in it accordingly. If in conceiving any event or object, we are uncertain whether we remember or only imagine, belief is suspended and we remain in doubt; but no sooner are we conscious that we remember, than belief instantly takes place; and we say, I am certain it was so, for now I remember it distinctly.

As to THE EVIDENCE THAT WE HAVE WHEN FROM EFFECTS WE INFER CAUSES, we may observe, that the law of our nature

determines us to believe, that *whatever begins to exist, proceeds from some cause.* If, on going home, I should find, on the table, a book, which I never saw before, it would occur to me as absolutely certain, that some cause had brought and some person made it. For if I were to be told, that nobody brought it, and that it never was made, I should, without hesitation, declare such a thing to be not only absurd but impossible; and there is not one rational being who in this would refuse to concur with me. Even children think in this manner, and some are very inquisitive into the causes of things: a proof that it is not experience merely which leads us to infer the cause from the effect. If the book, which I supposed myself to find, contained wise observations, and was well printed and bound, I must of necessity believe, that the author, printer, and binder, were possessed of wisdom and skill equal to the effect produced.

That being whom we believe to have proceeded from no cause but the necessity of his own nature, and to be self-existent, and on all other beings independent, we must also believe to have existed from eternity, or, in other words, to have had no beginning. For if every thing that had a beginning, proceeded from some cause, that which proceeded from no cause, could have had no beginning.

PROBABLE EVIDENCE is of two sorts.—One is, when, from facts whereof we have had experience, we infer facts of the *same* kind not experienced. It is natural for us to think, that the course of things whereof we have had experience, and now have, will continue, unless we have positive reason to believe that it will be altered. This is the ground of many of those opinions which we account quite certain. That tomorrow the sun will rise, and the sea ebb

and flow; that night will follow day, and spring succeed the winter; and that all men will die; are opinions amounting to certainty: and yet we cannot account for them otherwise than by saying, that such has been the course of nature hitherto, and we have no reason to believe that it will be altered. When judgments of this kind admit no doubt, as in the example given above, our conviction is called MORAL CERTAINTY. I am morally certain, that the sun will rise to-morrow, and set to-day, and that all men will die, &c. The instances of past experience, on which these judgments are founded, are innumerable; and there is no mixture of contradictory instances which might lead us to expect a contrary event. But if the experiences, on which we ground our opinions of this sort, are but few in number, or mixed with contradictory experiences, in this case we do not consider the future event as morally certain; but only more or less pro-

bable according to the greater or less surplus of favourable instances. The other sort of probable evidence, which is termed ANALOGICAL, is, when from facts whereof we have had experience, we infer facts of a *similar* kind not experienced; or, in other words, when we expect similar events in similar circumstances. For example, we think it probable that the planets are inhabited, they being in all respects so like our earth. The force of an argument from analogy is in proportion to the degree of likeness, that there is between the case *from which* we argue, and the case *to which* we argue. In the example given, the case from which we argue, is the circumstance of this earth's being a planet, warmed and enlightened by the sun, and inhabited by many varieties of living creatures; and the case to which we argue, is that of the other planets, which being in all other respects so similar to our earth, we think it highly

probable that they must resemble it in this, in being the habitation of percipient beings. A man who thinks, as Epicurus did, that they aro no bigger than they appear to his eye, can have no notion of their being inhabited, because to him they must appear in every respect so unlike our earth. And if we were to argue with him, in order to bring him over to our opinion, we should begin by explaining to him those particulars, wherein the earth and the other planets resemble each other. As soon as he understands these particulars as well as we, he will, of his own accord, admit the probability of our opinion.

Another and the last species of evidence, upon which we are to remark in this place, is TESTIMONY. It is natural for a man to speak as he thinks; and it is easy, like walking forward. One may walk backward, or sideways; but it is uneasy, and a

sort of force upon nature: and the same thing is true of speaking one thing and thinking another. It is also natural for us to believe what others seriously tell us. We trust the word of a man of whose veracity we have had experience; but we also credit testimony previously to such experience; for children, who have the least experience, are the most credulous. It is from having had experience of the dishonesty of men, and of the motives that tempt them to it, that we come to disbelieve or to distrust what they say. In general, when we doubt a man's word, we have some reason for it. We think that what he says is incredible in itself; or, that there is some motive or temptation which inclines him in the present case to violate truth; or, that he is not a competent judge of the matter in which he gives testimony; or, lastly, we distrust him now, because we know him to have been a deceiver formerly.

Faith in testimony often rises to absolute certainty. Of places and persons we never saw, and of which we know nothing but from the testimony of others, we believe many things as firmly as we believe our own existence. This happens, when the testimonies of men concerning such places and persons, are so many, and so consistent, that it seems impossible they should be fictitious. When a number of persons, not acting in concert, having no interest to disguise what is true, or to affirm what is false, and who are competent judges of what they testify, concur in making the same report, it would be accounted folly to disbelieve them, especially if what they testify be credible in itself. Even when three, or when two witnesses, separately examined, having had no opportunity to concert a plan beforehand, concur in the same declaration, we believe them, though we have had no experience of their veracity; because we

know, that in such a case their declarations would not be consistent, if they were not true. In regard to an impossible thing, we should not believe our own senses, nor consequently human testimony. Miraculous facts, however, are not to be ranked with impossibilities. To raise a dead man to life, to cure blindness with a touch, to remove lameness, or a disease, by speaking a word, are miracles: but to divine power as easy, as to give life to an embryo, make the eye an organ of sight, or cause vegetation to revive in the spring. If it be asked, what evidence is sufficient to establish the truth of miraculous events such as these, we answer, that every event admits of a proof from human testimony, which it is possible for a sufficient number of competent witnesses to see and to hear.

CHAPTER II.

Of Propositions, and their Various Kinds.

A PROPOSITION is a judgment of the mind expressed in words. Now as our judgments include at least two ideas, one of which is affirmed or denied of the other; so must a proposition have terms answering to these ideas. The idea, of which we affirm or deny, and of course the term expressing that idea, is called THE SUBJECT of that proposition. The idea affirmed or denied, as also the term answering to it, is called THE PREDICATE. Thus, in the proposition, *God is omnipotent,*—*God* is the subject, it being of him that we affirm omnipotence; and *omnipotent* is the predicate, because we af-

firm the idea, expressed by that word, to belong to God. And that word, in a proposition, which connects the subject and predicate together, is called THE COPULA; as in the above mentioned proposition, where *is*, is the copula, and signifies the agreement of the ideas of God and omnipotence. But if we mean to separate two ideas, then, besides the copula we must also use some particle of negation to express this repugnance. Of this kind, the proposition, *Man is not perfect*, may serve as an example; where the idea of *perfection* being intended to be separated from the idea of *man*, the negative particle *not* is inserted after the copula, to signify the disagreement between the subject and the predicate. But although every proposition necessarily consists of these three parts, it is not alike necessary that they be all severally expressed in words; because the copula is often included in the term of the predicate, as when we say *he*

writes, which imports the same as *he is writing*. And in the Latin language, a single word has often the force of a whole sentence; where *ambulat*, for example, is the same as *ille est ambulans; amo*, as *ego sum amans*.

Propositions are either AFFIRMATIVE or NEGATIVE, UNIVERSAL or PARTICULAR, ABSOLUTE or CONDITIONAL, SIMPLE or COMPOUND, SELF-EVIDENT or DEMONSTRABLE, SPECULATIVE or PRACTICAL.

An affirmative proposition connects the predicate with the subject; as, *A stone is heavy:* a negative separates them: as, *God is not the author of evil.* And as, in all cases, the predicate must either be connected with the subject, or separated from it, it is evident that all propositions fall under these two divisions.

An universal proposition is a proposition which has for its subject some general term taken in its full extent; so that the predicate agrees with all the individuals comprehended under it, if it be a proper species, and with all the several species and their individuals, if it be what is termed a genus. Thus, *All animals have a power of beginning motion*, is an universal proposition; *animals*, the subject being a general term without any mark of limitation, and by consequence taken in its full extent: hence the power of beginning motion may be affirmed of all the several species of animals, as of quadrupeds, birds, insects, fishes, &c.; and of all the individuals of which these different species consist, as of this hawk, that horse, and so on with respect to the rest. A particular proposition is one, which has, in like manner, some general term for its subject; but with a mark of limitation

added, to denote that the predicate agrees with some only of the individuals comprehended under it, if it be a species; or with one or more, not with all, of the species belonging to it, if it be a genus. Thus, *Some stones are heavier than iron—Some men have an uncommon share of prudence.* Where the subject of a proposition is an individual, it is called a SINGULAR PROPOSITION. Of this nature are the following, *Sir Isaac Newton was the inventor of fluxions—This book contains many useful truths.* And such propositions, though more particular than those which are generally called so, come under the same rule with universals; because, in them, the subject is taken in its full extent.

It has been already observed, that all propositions are either affirmative or negative: it is equally evident, that, in both cases, they may be universal or particular.

Hence arises that celebrated fourfold division of them, into UNIVERSAL AFFIRMATIVE, UNIVERSAL NEGATIVE; PARTICULAR AFFIRMATIVE, and PARTICULAR NEGATIVE. And, in forming syllogisms, it has become a custom, in the schools, to make use of the four vowels, *a*, *e*, *i*, *o*, to denote these varieties: *a*, to denote an universal affirmative, as, *All good men are esteemed*; *e*, an universal negative, as *No man is infallible*; *i*, a particular affirmative, as, *Some men are wise*; *o*, a particular negative, as *Some men are not honest*.*

The distinction of propositions into universal and particular, is called their QUANTITY; and into affirmative and negative, their QUALITY.

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* "*Asserit* a, *negat* e, *verum generaliter ambæ*:
"*Asserit* i, *negat* o, *sed particulariter ambo*."

Absolute propositions are those in which we affirm, that some property is inseparable from the idea of the subject; as, *Lead is heavy.* Conditional propositions are those in which the predicate is not necessarily connected with the subject, and can be affirmed of it on some condition only, distinct from the idea of the subject; as, *If a stone be exposed to the rays of the sun, it will contract a degree of heat.* And here we are to observe, that all conditional propositions consist of two distinct parts; one expressing the condition upon which the predicate agrees or disagrees with the subject, as, in the example before us, *If a stone be exposed to the rays of the sun;* the other, joining or disjoining said predicate and subject, as, in the same example, *It will contract a degree of heat.* The first of these parts is called the antecedent; the second, the consequent.

When a proposition has but one subject and one predicate, it admits of no subdivision, and is said to be simple. When it has more than one subject, or more than one predicate; or has several subjects and predicates; it is said to be compound. If it have one subject and more than one predicate, or, *vice versa*, one predicate and more than one subject, it may, in the one case, be resolved into as many simple propositions as there are predicates, and, in the other, into as many as there are subjects; as will be obvious from the following examples: *The practice of swearing in common conversation, is absurd, unmannerly, and impious—Neither kings nor people are exempt from death.* Nor is it less evident, that if a proposition consists of several subjects and predicates, it may be resolved into as many simple propositions, as there are subjects and predicates. Compound propositions

are of two kinds; *copulative* and *disjunctive*. A copulative proposition takes place, where the subjects and predicates are so joined together, that they may be all severally affirmed or denied of each other. Of this nature are the examples which have been just given. A disjunctive proposition compares several predicates with the same subject, and affirms that one of them necessarily belongs to it, but without determining which; as, *This world either exists of itself, or is the work of some allwise and powerful cause.* It is the nature of all propositions of this class, that, upon determining the particular predicate, the rest are of course to be removed; or, that if all the predicates but one be removed, that one necessarily takes place: thus, in the example given above, if we allow the world to be the work of some wise and powerful cause, we of course deny it to be self-existent; or, if we deny it to be self-existent, we must necessarily admit,

that it was produced by some wise and powerful cause

A proposition is self-evident, when, without any investigation or proof, the truth of it is obvious at first view. When we affirm, for instance, that *a part of any thing is less than the whole*, or *that men exist, and other animals;* whoever understands the terms made use of, perceives at the first view, the truth of what is asserted; nor can he, by any efforts, bring himself to believe the contrary. A demonstrable proposition is one, the truth of which does not immediately appear, but may be made to appear by means of other propositions more known and obvious, from which it follows as an unavoidable consequence.

A speculative proposition affirms or denies some property of its subject, as when it is affirmed, that *the radii of a circle are all*

equal. A practical proposition asserts that something may be done or effected: as, that *a right line may be drawn from one point to another.* And from this last distinction arises a fourfold division of mathematical propositions, into SELF-EVIDENT SPECULATIVE, and SELF-EVIDENT PRACTICAL; DEMONSTRABLE SPECULATIVE, and DEMONSTRABLE PRACTICAL. Self-evident speculative propositions are called AXIOMS; and self-evident practical propositions, POSTULATES; demonstrable speculative propositions, THEOREMS: and demonstrable practical propositions, PROBLEMS.

PART III.

Of Reasoning.

The subject of this part of Logick is an extensive one; and to discuss it fully would require much time. We shall content ourselves with explaining what is meant by reasoning, and giving some account of various kinds of syllogisms, which are acts of reasoning expressed in words. To which we shall subjoin such of the sophisms, or false arguments, as are the most remarkable.

CHAPTER I.

Of Reasoning, and the Parts of which it consists.

It has been already observed, that, in comparing two ideas together, it will sometimes happen, that their agreement or disagreement cannot be *immediately** discerned. In such cases it becomes necessary to look out for some third idea, that will admit of being compared with them, severally: that is, first with one and then with the other: that, by such comparison, we may be enabled to see how far the ideas, with

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* That is, without some *medium*, or proof.

which this third is compared, do, themselves, agree or disagree. For it is a self-evident truth, that, *if two things agree with a third, they must agree with each other*, and that, *if one of two things agree with a third, and the other disagree with it, they must disagree with each other.*

From what has been said, it appears, that every act of reasoning necessarily includes three distinct judgments: two, in which the ideas, the relations of which we want to discover, are severally compared with the middle idea: and a third, in which they are themselves connected or disjoined, according to the result of that comparison. Now, as our judgments, when put into words, are called propositions; so our acts of reasoning, when expressed by words, are termed SYLLOGISMS. And hence it follows, that as every act of reasoning implies three several judgments, so every syllogism

must include three distinct propositions. And when an act of reasoning is thus put into words, and appears in the form of a syllogism, the intermediate idea made use of to discover the agreement or disagreement which we seek to investigate, is called the MIDDLE TERM; and the two ideas themselves, with which this third is compared, go by the name of EXTREMES.

But, as these things are best illustrated by examples, let us suppose, that we have set ourselves to enquire, *whether men are accountable for their actions.* As the relation between the ideas of *man* and *accountableness,* comes not within the immediate view of the mind, our first care must be, to find out some third idea that will enable us to discover and trace it. A very small measure of reflection is sufficient to inform us, that no creature can be accountable for his actions, unless we suppose him capable

of distinguishing those which are good from those which are bad; that is, unless we suppose him possessed of reason. Nor is this alone sufficient. For what would it avail him to distinguish good from bad actions, if he had no freedom of choice, and could not pursue the one and avoid the other? Hence it becomes necessary to take in both these considerations in the present case. It is at the same time equally evident, that wherever there is this ability of distinguishing good from bad actions, and pursuing the one and avoiding the other, there also a creature is accountable. We have then got a third idea, with which *accountableness* is inseparably connected, namely, the idea of *a creature possessed of reason and liberty.* Let us now take this third or middle idea, and compare it with the other idea in question, namely *man*; and we all know by experience, that it may be affirmed of him. Having thus, by means of the intermediate

idea, formed two several judgments, that *man is possessed of reason and liberty*, and that *reason and liberty imply accountableness;* a third obviously and necessarily follows, namely, that *man is accountable for his actions.*

Here then we have a complete act of reasoning, in which, according to what has been already observed, there are three distinct judgments; two, that may be styled previous, in as much as they lead to the other, and arise from comparing the middle idea with the two ideas in question; and a third, which is a consequence of these previous acts, and flows from uniting the extreme ideas themselves. If now we put this act of reasoning into due form, it exhibits what Logicians call a syllogism, and runs thus:

Every creature, possessed of reason and liberty is accountable for his actions.

Man is a creature possessed of reason and liberty:

Therefore man is accountable for his actions.

Of these three propositions, the two first answer the two previous judgments, in an act of reasoning; and are called THE PREMISES, because they are *placed before* the other: the third is termed THE CONCLUSION; as being *gained* in consequence of what was asserted in the premises. *Man and accountableness* are the extremes; and *a creature possessed of reason and liberty*, the middle term.

We may also observe, that, as the conclusion is made up of the extreme terms of the syllogism, so that extreme, which serves as the predicate of the conclusion, goes by the name of THE MAJOR TERM; and the other extreme, which makes the subject in the

same proposition, is called THE MINOR TERM. And again, from this distinction between the extremes arises also a distinction between the premises, where these extremes are severally compared with the middle term; that proposition which compares the major term, or the predicate of the conclusion, with the middle term, being called THE MAJOR PROPOSITION; the other, wherein the same middle term is compared with the subject of the conclusion or minor term, being called THE MINOR PROPOSITION. To which may be added, that, when a syllogism is proposed in due form, the major proposition is always placed first, the minor next, and the conclusion last.

These things premised, we may define reasoning to be, *An act or operation of the mind, deducing some proposition, the truth of which was before unknown, from other previous ones that are either self-evident or*

such as have been fully proved and established. These previous propositions, in a simple act of reasoning, are only two in number; and, in order to afford an unquestionable conclusion, must be intuitive propositions. When they are not so, previous syllogisms are required: in which case reasoning becomes a complicated act, taking in a variety of successive steps. If, for example, in the major of the syllogism given above, viz. *Every creature possessed of reason and liberty is accountable for his actions*, the connexion between the subject and predicate could not be perceived by the mere attention of the mind to the ideas themselves, it is evident that this propsition would no less require proof than the conclusion deduced from it. In this case, a new middle term must be sought for, to trace the connexion here supposed; and this of course, furnishes another syllogism; by which having established the proposition

in question, we are then, and not before, at liberty to use it in any succeeding act of reasoning. And should it so happen, that, in the second syllogism, there were still some previous proposition, the truth of which did not appear at first sight, we must then have recourse to a third syllogism, in order to lay open that truth to the mind; because, so long as the premises remain uncertain, the conclusion, built upon them, must be so too. And when, by conducting our thoughts in this manner, we at last arrive at some syllogism where the previous propositions are intuitive truths, the mind then rests in full security; as perceiving, that the several conclusions, which it has passed through, stand upon the immoveable foundation of self-evidence, and when traced to their source, terminate in it.

And here, if, after having thus unravelled a demonstration, we take it the contrary

way, and observe how the mind, setting out with intuitive propositions, connects them together to form a conclusion; how, by introducing this conclusion into another syllogism, it still advances one step farther; and so proceeds, making every new discovery subservient to future progress; we shall then perceive clearly, that reasoning, in the highest exercise of that faculty, is no more than an orderly combination of those simple acts which we have already so fully explained. And we shall also perceive, that all the knowledge acquired by reasoning, how far soever we may carry our discoveries, is still built upon our intuitive judgments; every discovery of human reasoning being the consequence of a syllogism, the premises of which are self-evident propositions, or of a train of syllogisms, which, when traced to their source, always terminate in them

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MEN reason, either to rank things under those universal ideas to which they truly belong, or to ascribe to them their several attributes and properties in consequence of that distribution.

1. One great end for which men reason, is to rank things under those universal ideas to which they belong; or, in other words, to determine the genera and species of things. We have seen, in the first part of this treatise, how the mind proceeds in forming general ideas. We have also seen, in the second part, how, by means of these general ideas, we form universal propositions. Now, as in universal propositions, we affirm some property of a genus or spe-

cies, it is plain, that we cannot apply this property to particular objects, till we have first determined whether they are comprehended under that general idea of which the property is affirmed. Thus, there are certain properties belonging to all *even* numbers, which nevertheless cannot be applied to any particular number, until we have first discovered it to be of the species expressed by that general name. Hence, reasoning begins by referring things to their several divisions and classes in the scale of our ideas: and, as these divisions are all distinguished by peculiar names, we hereby learn to apply the terms expressing general conceptions, to such particular objects as come under our immediate observation.

In order to arrive at these conclusions, by which the several objects of perception are brought under general names, two things are manifestly necessary. First, that we

take a view of the idea itself denoted by that general name, and carefully attend to the distinguishing marks which serve to characterise it. Secondly, that we compare this idea with the object under consideration, observing diligently wherein they agree or differ. If the idea be found to correspond with the particular object, we then without hesitation apply the general name; but, if no such correspondence appear, the conclusion must necessarily take a contrary turn. Let us, for instance, take the number *eight*, and consider by what steps we are led to pronounce it an *even* number. First, we call to mind the idea signified by the expression, *an even number;* namely, that it is a number divisible into two equal parts: we, then, compare this idea with the number *eight;* and, finding them manifestly to agree, we see at once the necessity of admitting the conclusion.

These several judgments, therefore, transferred into language, and reduced to the form of a syllogism, appear thus:

Every number that may be divided into two equal parts, is an even number:

The number eight may be divided into two equal parts:

Therefore the number eight is an even number.

It may be observed, indeed, that where the general idea, to which particular objects are referred, is very familiar to the mind, and frequently in view, this reference, and the application of the general name, seem to be made without any reasoning. When we see a horse in the fields, or a dog in the street, we readily apply the name of the species; habit, and a familiar acquaintance with the general idea, suggesting it instan-

taneously to the mind. We are not, however, to imagine, on this account, that the understanding departs from the usual rules of just thinking. A frequent repetition of acts begets a habit; and habits are attended with a certain promptness of execution, that prevents our observing the several steps and gradations, by which any course of action is accomplished. But, in other instances, where we judge not by pre-contracted habits; as when the general idea is very complex, or less familiar to the mind; we always proceed according to the form of reasoning established above. A goldsmith, for instance, who is in doubt as to any piece of metal, whether it be of the species called *gold*, first examines its properties; and, then comparing them with the general idea signified by that name, if he find a perfect correspondence, no longer hesitates under what class of metals to rank it. Now what is this, but following step by step those rules

of reasoning which we have before laid down, as the standards by which to regulate our thoughts in all conclusions of this kind?

Nor let it be imagined, that our researches here, because in appearance bounded to the imposing of general names upon particular objects, are therefore trivial and of little consequence. Some of the most considerable debates among mankind, and such too as nearly regard their lives, interest, and happiness, turn wholly on this article. Of what importance, for instance, is it, in many cases, to decide aright whether an action is to be termed murder or manslaughter? We see, no less than the lives and fortunes of men depend often upon these decisions. The reason is plain. Actions, when once referred to a general idea, draw after them all that may be affirmed of that idea; insomuch, that the determining of the

species of actions, is the same with determining what proportion of praise or dispraise, commendation or blame, &c., ought to follow them. For, as it is allowed that murder deserves death, by bringing any particular action under the head of murder, we of course decide the punishment due to it.

2. The other great aim which men have in view in their reasonings, is, the discovering and ascribing to things their several attributes and properties. And here it will be necessary to distinguish between reasoning, as it regards the sciences, and as it concerns common life. In the sciences, our reason is employed chiefly about universal truths, it being by them alone, that the bounds of human knowledge are enlarged. Hence the divisions of things into various classes, called genera and species. For these universal ideas being set up as the re-

presentatives of many particular things, whatever is affirmed of them, may be also affirmed of all the individuals to which they belong. *Murder*, for instance, is a general idea, representing a certain species of human actions. Reason tells us, that the punishment due to it is *death*. Hence every particular action coming under the idea of *murder*, has the punishment of death allotted to it. Here, then, we apply the general truth to some obvious instance, and this is what properly constitutes the reasoning of common life. For men in their ordinary transactions and intercourse one with the other, have for the most part to do only with particulars objects.

Hence it appears, that reasoning, as it regards common life, is no more than the ascribing of the general properties of things to those several objects with which we are immediately concerned, according as they

are found to be of that particular division or class, to which the properties belong. The steps by which we proceed are manifestly these. First, we refer the object under consideration to some general idea or class of things; we then recollect the several attributes of that general idea; and, lastly, ascribe all those attributes to the present object. Thus, in considering the character of Sempronius, if we find it to be of the kind called *virtuous;* when we at the same time reflect, that a *virtuous* character is deserving of esteem; it naturally and obviously follows, that Sempronius deserves esteem. These thoughts put into a syllogism, in order to exhibit the form of reasoning here required, run thus:

Every virtuous man is deserving of esteem:
Sempronius is a virtuous man:
Therefore, Sempronius is deserving of esteem.

From this syllogism it appears, that before we affirm any thing of a particular object, that object must be referred to some general idea. Sempronius is pronounced worthy of esteem, only in consequence of his being a virtuous man, or coming under that general idea. Hence we see the necessary connexion of the various parts of reasoning, and the dependence they have, one upon another. The determining of the genera and species of things is an exercise of human reason; and this exercise is the first in order and previous to the other, which consists in ascribing to them their powers, properties, and relations. But when we have taken this previous step, and brought particular objects under general names; as the properties we ascribe to them are no other than those of the general idea, it is plain, that, in order to a successful progress in this part of knowledge, we must thoroughly acquaint ourselves with the several

relations and attributes of these our general ideas. When this is done, the other part will be easy and require scarce any labour of thought, as being no more than an application of the general form of reasoning represented in the foregoing syllogism.

CHAPTER II.

Of Syllogisms.

SYLLOGISMS may be divided into SINGLE and COMPOUND. Single syllogisms are those which consist of three propositions, and no more. Compound syllogisms are those which consist of more than three propositions, and may be formed into two or more syllogisms.

Of Single Syllogisms.

Single syllogisms may be divided into several sorts; of which the most important are SIMPLE OR CATEGORICAL, CONDITIONAL, and DISJUNCTIVE.

Those are properly called Simple, or Categorical, syllogisms, which are made up of three plain, simple, or categorical propositions; in which, the middle term is joined with one part of the question in the major proposition, and with the other in the minor.

And here, to guard us against false inferences, certain *rules* have been found necessary, which depend on the four following *axioms*.

1. Particular propositions are contained in universals, and may be inferred from them; but universals are not contained in particulars, and cannot be inferred from them.

2. In all universal propositions, the subject is universal; in all particular propositions, the subject is particular.

3. In all affirmative propositions, the predicate has no greater extension than the subject; for its extension is restrained by the subject: and therefore it is always to be esteemed as a particular idea. It is by mere accident, if ever it be taken universally; and cannot happen, but in such universal or singular propositions as are reciprocal.*

4. The predicate of a negative proposition is always taken universally: for in its whole extension, it is denied of the subject. If we say, *No stone is vegetable,* we deny all sorts of vegetation concerning stones.

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* A proposition is said to be *reciprocal,* when the subject and the predicate may mutually interchange their places with preservation of the truth.

The *rules* are these:

1. *The middle term must not be taken twice particularly, but once at least universally.* For if the middle term be taken for two different parts or kinds of the same universal idea, then the subject of the conclusion, or minor extreme, is compared with one of these parts, and the predicate, or major extreme, with the other part, and this will never show whether that subject and predicate agree or disagree; for there will then be four distinct terms in the syllogism, and the two parts of the question, that is, the two extremes, will not be compared with the same third idea.

2. *The terms, in the conclusion, must never be taken more universally than they are in the premises.* The reason is derived from the first axiom, that *generals can never be inferred from particulars.*

3. *A negative conclusion cannot be proved by two affirmative premises.* For, when the two terms of the conclusion are united, or agree with the middle term, it does not by any means follow that they disagree with one another.

4. *If one of the premises be negative, the conclusion must be negative.* For if the middle term be denied of either part of the conclusion, it may show that the terms of the conclusion disagree, but it can never show that they agree.

5. *If either of the premises be particular, the conclusion must be particular.* This may be proved from the first axiom. These two last rules are sometimes united in this single sentence, *The conclusion always follows the weaker part of the premises.* For negatives and particulars are ac-

counted inferior to affirmatives and universals.

6. *From two negative premises, nothing can be concluded.* For they separate the middle term both from the subject and the predicate of the conclusion; and when two ideas disagree with a third, we cannot infer that they either agree or disagree with each other.

7. *From two particular premises, nothing can be concluded.* This rule depends chiefly on the first axiom.

In forming syllogisms, especially those of which we are now treating, we make use of FIGURES and MOODS. By the Figure of a syllogism, is meant the peculiar way in which the middle term is connected with the extremes. By the Moods belonging to a figure, are meant, the several ways in which

the propositions of one syllogism may differ from those of another, belonging to the same figure, as to quantity and quality; that is, as to their being universal or particular, affirmative or negative.

Figures are usually reckoned *three*. In the *first*, the middle term is the subject of the major, and the predicate of the minor, proposition. In the *second*, it is the predicate of both these propositions; and, in the *third*, the subject.*

The moods, belonging to each of these figures, are signified by certain artificial words, in which the consonants are neglected, and the vowel only regarded; *a*, denoting, as was before observed, an universal

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Sub præ, primæ; bis *præ*, secundæ; tertiæ, bis *sub*.

affirmative; *e*, an universal negative; *i*, a particular affirmative; and *o*, a particular negative. And to assist the memory in retaining these words, they are comprised in four Latin verses.

Barbara, Celarent, Darii, Ferio quoque, primæ:
Cesare, Camestres, Festino, Baroco, secundæ:
Tertia, *Darapti* sibi vindicat atque *Felapton,*
Adjungens *Disamis, Datisi, Bocardo, Ferison.*

BAR- All *wicked men* are miserable:
BA- Tyrants are *wicked men:*
RA. Therefore tyrants are miserable.

CE- No practice, *inconsistent with the Christian law of charity,** can be innocent.

LA- The practice of reducing men, of any colour, to a state of slavery, is *inconsistent with the Christian law of charity.*

RENT. Therefore the practice of reducing men, of any colour, to a state of slavery, cannot be innocent.

DA- *Whatsoever furthers our salvation* is good for us:

BI- Some afflictions *further our salvation:*

I. Therefore some afflictions are good for us.

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* Whatsoever ye would that men should do to you, do ye even so to them.—MATT. vii. 12.

FE- *Nothing that must be repented of,* is desirable:

RI- Sinful pleasures *must be repented of:*

O. Therefore sinful pleasures are not desirable.

It is the excellence of this figure, that all questions may be proved by it, whether universal or particular, affirmative or negative.

In the *second* figure also, there are four moods; but it admits of negative conclusions only.

CE- No one, who is either a good Christian, or a good citizen, can *deliberately resolve to do what the laws of God and his country forbid :*

SA- A duellist *deliberately resolves to do what the laws of God and his country forbid :*

RE. Therefore no duellist can be, either a good Christian, or a good citizen.

CA- Every man of strict honour would *disdain to enrich himself at his neighbour's expense :*

MES- No gamester *disdains to enrich himself at his neighbour's expense :*

TRES. Therefore no gamester is a man of strict honour.

FES- No sins are *excusable :*

TI- Anger, upon some occasions, is *excusable :*

NO. Therefore anger, upon some occasions, is not a sin.

BA- Every true patriot will *seek to promote peace and concord among his fellow citizens :*

RO- Some, who profess to be patriots, do not *seek to promote concord and peace among their fellow-citizens.*

CO. Therefore some, who profess to be patriots, are not true patriots.

In the *third* figure, there are six moods; and the conclusion is always particular.

DA- *All good Christians* shall be saved :

RAP- *All good Christians* have sinned :

TI. Therefore some, who have sinned, shall be saved

FE- No *hypocrites* are pleasing to God :
LAP- All *hypocrites* seem to be religious :
TON. Therefore some, who seem to be religious, are not pleasing to God.

DI- Some *selfish and turbulent men* make very violent pretensions to patriotism :
SA- All *selfish and turbulent men* are destitute of any real love for their country :
MIS. Therefore some, who are destitute of any real love for their country, make very violent pretensions to patriotism.

DA- All *honest men* are entitled to our love and esteem:

TI- Some *honest men* differ very widely from us in their sentiments with respect to religion and politics:

SI. Therefore some, who differ very widely from us in their sentiments with respect to religion and politics, are entitled to our love and esteem.

BO- Some *wars* are not to be avoided:

CAR- All *wars* produce blood-shed:

DO. Therefore some blood-shed is not to be avoided.

FE- No *afflictions* are pleasant:

RI- Some *afflictions* are good for us:

SON. Therefore some things, which are good for us, are not pleasant.

The *special rules* of the three figures are these. In the first, *the major proposition must always be universal. and the minor affirmative.* In the second, *the major must also be universal, and one of the premises, together with the conclusion, must be negative.*—In the third, *the minor must be affirmative, and the conclusion always particular.*

There is also a fourth; in which the middle term is the predicate of the major proposition. and the subject of the minor. But this, being a very indirect and oblique manner of concluding, is never used in the sciences, or in common life; and is, consequently, useless.

A Conditional or Hypothetical Syllogism is a syllogism of which the major is a conditional or hypothetical proposition; as,

If there be a God he ought to be worshipped:

But there is a God:

Therefore he ought to be worshipped.

And here it is to be observed, that, in all propositions of this kind, the antecedent must always contain some certain and genuine condition, which necessarily implies the consequent; for otherwise the proposition itself will be false, and therefore ought not to be admitted into our reasonings. Hence it follows, that, when any conditional proposition is assumed, if we admit the antecedent of that proposition, we must at the same time necessarily admit the consequent; but that, if we reject the consequent, we must in like manner necessarily reject the antecedent. It appears then, that, in conditional syllogisms, there

are two ways of arguing which lead to a certain and unavoidable conclusion. 1. *From the admission of the antecedent, to the admission of the consequent:* which constitutes the mood or species of hypothetical syllogisms, distinguished in the schools by the name of the MODUS PONENS; inasmuch as by it the whole conditional proposition is *established.* And, of this mood, the syllogism given above is an example. 2. *From the removal of the consequent, to the removal of the antecedent:* which constitutes the mood or species called by Logicians the MODUS TOLLENS, because by it both antecedent and consequent are *rejected;* as appears by the following example.

If the sun be risen, the night is past:

But the night is not past:

Therefore the sun is not risen.

These two species take in the whole class of conditional syllogisms, and include all the possible ways of arguing which lead by them to a legitimate conclusion; because we cannot here proceed by a contrary process of reasoning, that is, from the removal of the antecedent to the removal of the consequent, or from the establishing of the consequent to the establishing of the antecedent. For although the antecedent always expresses some real condition, which once admitted, necessarily implies the consequent, yet it does not follow that there is therefore no other condition; and if so, then, after removing the antecedent, the consequent may still hold, because of some other condition which implies it. When we say, *If a stone be exposed for some time to the rays of the sun, it will contract a degree of heat;* the proposition is certainly true, and admitting the antecedent we must admit the consequent. But, as there are other ways by

which a stone may contract a degree of heat, it will not follow, from the absence of the before mentioned condition, that therefore the consequent cannot take place. In other words, we cannot argue, *But this stone has not been exposed to the rays of the sun; therefore it has not contracted a degree of heat;* inasmuch as there are other ways, by which heat might have been contracted by it. And as we cannot argue from the removal of the antecedent to the removal of the consequent, no more can we argue from the admission of the consequent to the admission of the antecedent. Because, as the consequent may flow from a variety of causes, the allowing of it does not determine the precise cause, but only that there must have been some one of them. Thus, in the foregoing proposition, *If a stone be exposed for some time to the rays of the sun, it will contract a degree of heat.*—admitting the consequent, namely, that *it has contract-*

ed a degree of heat, we are not therefore bound to admit the antecedent, that *it has for some time been exposed to the rays of the sun;* inasmuch as there are other causes whence that heat may have proceeded. These two ways, therefore, of arguing, hold not in conditional syllogisms: except, indeed, where the antecedent expresses the only condition; which is a case that happens but seldom, and cannot be extended to a general rule.

A disjunctive syllogism is a syllogism of which the major is a disjunctive proposition; as in the following example.

The world is either self-existent, or the work of some finite, or of some infinite being:

But it is not self-existent, or the work of a finite being:

Therefore it is the work of an infinite being.

Now a disjunctive proposition is that, in which, of several predicates, we affirm one necessarily to belong to the subject, to the exclusion of all the rest; but leave that particular one undetermined. Hence it follows, that, as soon as we determine the particular predicate, all the rest are of course to be rejected; or if we reject all the predicates but one, that one necessarily takes place. When therefore, in a disjunctive syllogism, the several predicates are enumerated in the major, if the minor establishes any one of these predicates, the conclusion ought to remove all the rest; or if in the minor, all the predicates but one are removed, the conclusion must necessarily establish that one. Thus, in the disjunctive syllogism given above, the major affirms one of three predicates to belong to the world; namely, that it is *self existent*, or that it is the *work of a finite*, or that it is the *work of an infinite being;* two of these predicates

are removed in the minor; namely, *self-existence*, and *the work of a finite being:* hence the conclusion necessarily ascribes to it the third predicate, and affirms that it is *the work of an infinite being*. If now we give the syllogism another turn, so that the minor may *establish* one of the predicates, by affirming the world to be *the production of an infinite being;* then the conclusion must remove the other two; by affirming it to be neither *self-existent*, nor the *work of a finite being*. These are the forms of reasoning in this species of syllogisms; the justness of which appears at first sight; and that there can be no other, is evident from the very nature of a disjunctive proposition.

In the several kinds of syllogisms hitherto mentioned, the parts, it may be observed, have always been complete; that is, the three propositions, of which they consist, have been always expressed. But it often happens, that one of the premises is a truth, not only evident, but also familiar, and in the minds of all men; in which case, it is generally omitted: and by this means we have an imperfect syllogism, which seems to be made up of only two propositions. Should we, for instance, argue in this manner,

God is our Creator,
Therefore he must be worshipped:

the syllogism appears to be imperfect, as consisting but of two propositions: yet it is, in reality, complete; except that the major, *Our Creator must be worshipped,* is omitted, and left to the reader to supply as a propositions so familiar and evident, that it cannot escape him. And these seemingly imperfect syllogisms are called ENTHYMEMES.

And here, as enthymemes are the only modes of reasoning which are in general use, it may not be improper to take some notice of their various forms.

Sometimes the reasoning proposition, that is, the proposition expressed, as the foundation of the conclusion, is placed first; and the conclusion follows, with the sign of reasoning prefixed to it; as in the foregoing example: and this form constitutes, what,

for the sake of distinction, may be called the REGULAR ENTHYMEME.

Another form, termed by a late writer* the OBVIOUS ENTHYMEME, resembling the preceding, but yet somewhat different from it, is, where the reasoning proposition is in like manner placed first, and the conclusion after it; but with the sign of reasoning prefixed, not to the latter, but to the former: for example,

Since (or as) God is our Creator,
He must be worshipped.

A third form, which is termed the CAUSAL ENTHYMEME, is that, in which the reasoning proposition, with the sign of reason-

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* Mr. Collard.

ing prefixed to it, follows the conclusion; thus,

God must be worshipped;
*Because he is our Creator.**

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* To these the writer, above alluded to, has added a fourth, which he calls the HYPOTHETICAL ENTHYMEME; as,

If God be our Creator,
He must be worshipped.

Here, according to our author, there is a conclusion gained, that *God must be worshipped;* founded on a supposition, which, though not expressed, is understood, and supposed to be obvious, namely, that *our creator must be worshipped:* And, when this supposition is expressed, the act of reasoning will assume the form of a syllogism, Thus,

But whatever be the form of the enthymeme, it will be easy for the reader to supply what is wanting, and to convert any

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Our Creator must be worshipped:

If God be (that is, admit that God is) our Creator:

(And you cannot but admit, that) He must be worshipped.

And this enthymeme, as he terms it, though it has hitherto been called, by all writers on the subject, a proposition, is, he contends, one of the most common, and, certainly one of the most useful, forms of reasoning in the compass of language.

But, be this as it may, he very justly cautions us against supposing, that *any* two propositions, one taken conditionally and the other positively, will form an hypothetical enthymeme; which can-

such act of reasoning into a regular syllogism. For he has only to ask himself, upon what supposition the conclusion, which is drawn from the reasoning proposition, depends; and when this supposition, which is always an obvious one, is once

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not be, unless the attributes which should constitute the major and middle terms, that is, unless the predicate of the conditional proposition and the predicate of the positive proposition, be such as universally agree, or universally disagree, with each other. These propositions, for example,

If I had leisure,
I would dedicate much time to study,

do not constitute an act of reasoning; because it is not an universal fact, that every one, who has leisure, would, or would not, dedicate much time to study.

discovered, it will be the proposition omitted. For example,

God is our Creator:
Therefore he is to be worshipped.

Upon what supposition does this conclusion depend? Evidently upon this; that *our Creator is to be worshipped.* Let this supposition then be expressed, and the syllogism is complete.

Our creator is to be worshipped:
God is our Creator:
Therefore God is to be worshipped.

But there is another species of reasoning with two propositions, which seems to be complete in itself, and where we admit the conclusion without any tacit or supposed judgment in the mind, from which it follows syllogistically. This happens between propositions where the connexion is such, that the admission of the one, necessarily, and at the first sight, implies the admission of the other. For if it so happen, that the proposition on which the other depends is self-evident, we content ourselves with barely affirming it, and infer the other by a direct conclusion. Thus by admitting an universal proposition, we are forced also to admit of all the particular propositions comprehended under it, this being the very

condition that constitutes a proposition universal. If then, that universal proposition chances to be self-evident, the particular ones follow of course, without any farther train of reasoning. Whoever allows, for instance, *that things equal to one and the same thing, are equal to one another*, must at the same time allow, *that two triangles, each equal to a square whose side is three inches, are equal to one another.* This argument therefore,

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

Therefore these two triangles, each equal to the square of a line of three inches, are equal to one another;

is complete in its kind, and contains all that is necessary towards a just and legitimate conclusion. For the first or universal proposition is self-evident, and therefore re-

quires no farther proof. And as the truth of the particular is inseparably connected with that of the universal, it follows from it by an obvious and unavoidable consequence.

Now in all cases of this kind, where propositions are deduced one from another on account of a known and evident connexion, we are said to reason by IMMEDIATE CONSEQUENCE. It is true, that these arguments may be considered as enthymemes, whose major propositions are wanting.—The argument, for instance, but just mentioned, when represented according to this view will run as follows:

If things equal to one and the same thing, are equal to one another, these two triangles, each equal to a square whose side is three inches, are also equal to one another:

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

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

But then it is peculiar to them, that the ground upon which the conclusion rests, namely, its coherence with the minor, is of itself evident, and seems immediately to follow from the rules and reasons of logick. As it is therefore entirely unnecessary to express a self-evident connexion, the major, whose office that is, is constantly omitted ; nay, and seems so very little needful to enforce the conclusion, as to be accounted no part of the argument.

Of Compound Syllogisms.

A Compound Syllogism consists, as was before observed, of more than three propositions, and may be resolved into two or more syllogisms. The chief of these are the EPICHIREMA, DILEMMA, PROSYLLOGISM, SORITES, and INDUCTION of particulars.

Epichirema is a syllogism, in which we prove the major, or the minor, or both, before we draw the conclusion: as,

Sickness may be good for us; because it brings us to consider our ways:

But we are uneasy under sickness; as appears from our sighs, groans, and complaints:

Therefore we are sometimes uneasy, under what is good for us.

A Dilemma is an argument, by which we endeavour to prove the absurdity or falsehood of some assertion. In order to this, we assume a conditional proposition, the antecedent of which is the assertion to be disproved, and the consequent a disjunctive proposition, enumerating all the possible suppositions upon which that assertion can take place. If then it appear, that all these suppositions ought to be rejected, it is plain that the antecedent or assertion itself must be rejected also. When, therefore, such a proposition is made the major of any syllogism, if the minor rejects all the suppositions contained in the consequent, it follows necessarily, that the conclusion must reject the antecedent; which, as has been said, is the assertion to be disproved.—

Hence it appears, that we may define a dilemma to be a conditional or hypothetical syllogism, where the consequent of the major is a disjunctive proposition, which is wholly taken away or removed in the minor. It follows, that a dilemma is an argument in the *modus tollens* of conditional syllogisms. And it is plain, that if the antecedent of the major be an affirmative proposition, the conclusion will be negative; but that, if it be a negative proposition, the conclusion will be affirmative.

The following is an example.

If God did not create the world perfect in its kind; it must have proceeded, either from want of inclination, or want of power:

But it could not have proceeded, either from want of inclination, or want of power:

Therefore it is absurb to say, that God did not create the world perfect in its kind.

A dilemma may be faulty three ways. 1. When what is affirmed or denied, in the minor, concerning the several suppositions in the consequent of the major, is false. 2. When all the possible suppositions upon which the assertion, contained in the antecedent, can take place, are not fully enumerated in the consequent. 3. When the argument may be retorted with equal force against him who uses it.*

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* There was, says Dr. Watts, a famous ancient instance of this case, wherein a dilemma was retorted. Euathlus promised Protagoras a reward when he had taught him the art of pleading, and it was to be paid the first day that he gained any cause in the court. After a considerable time, Protagoras goes to law with Euathlus for the reward, and uses this dilemma. *Either the cause will go on my side, or on yours: if the cause goes on my side, you must pay me according to the*

A Prosyllogism is a form of reasoning, in which two or more syllogisms are so connected together, that the conclusion of the former is the major or minor of the following.

Blood cannot think:
But the soul of man thinks:
Therefore the soul of man is not blood:

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sentence of the judge: if the cause goes on your side, you must pay me according to bargain: therefore *whether the cause goes for me, or against me, you must pay me the reward.* But Euathlus retorted this dilemma, thus. *Either I shall gain the cause, or lose it: if I gain the cause, then nothing will be due to you according to the sentence of the judge: and if I lose the cause, nothing will be due to you, according to my bargain:* therefore, *whether I lose or gain the cause I will not pay you: for nothing will be due to you.*

Watts's Logick, part III. c. ii. s. 6.

The soul of a brute is blood:

Therefore the soul of man is different from the soul of a brute.

A Sorites is a way of arguing, in which several propositions are so linked together that the predicate of one becomes continually the subject of the next following: until at last a conclusion is formed, by bringing together the subject of the first proposition, and the predicate of the last; as in the following example.*

There can be no enjoyment of property, without government:

No government, without a magistrate:

No magistrate, without obedience:

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* Themistocles, it is said, was sometimes wont to use this form of reasoning, when, in the way of pleasantry, he was disposed to speak of,

And no obedience, where every one acts as he pleases:

Therefore, there can be no enjoyment of property where every one acts as he pleases.

Reasoning by Induction, is when we infer universally concerning any idea, what we have before affirmed or denied, separately, of all its several parts or subdivisions. Thus, if we suppose the whole race

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and exaggerate the influence of his son, who was then a child:

My son governs his mother:
His mother governs me:
I govern Athens:
Athens governs Greece:
Greece governs the world:
Therefore my son governs the world.

of animals subdivided into men, beasts, birds, insects, and fishes, and then reason concerning them in this manner—*All men have the power of beginning motion ; all beasts have this power ; all birds ; all insects ; all fishes : therefore all animals have the power of beginning motion*—the argument is an Induction. The truth of the conclusion, in this way of reasoning, depends upon the parts and subdivisions being fully enumerated.

To this chapter, which treats of various kinds of syllogisms, it may not be improper to add some account of several sorts of arguments, which are usually distinguished by Latin names. For as these names will occasionally occur in books and in conversa-

tion, it will be of use to understand what is meant by them.

Demonstrations A PRIORI are those which prove the effect from the cause: as, *The scripture is infallible; because it is the word of God, who cannot lie.* Demonstrations A POSTERIORI, on the contrary, are those which prove the cause from the effect: as, *All the works of God are useful and well contrived: therefore the Creator is wise and good.*

The ARGUMENTUM DUCENS IN ABSURDUM has been already explained. We shall only add, that it is sometimes called REDUCTIO AD ABSURDUM, and a proof PER IMPOSSIBILE.

When we infer, that a certain proposition is true, because another has been proved to be true, which is less probable, this is

called an argument EX MINUS PROBABILI AD MAGIS.

When we argue from the certainty of a thing in the same circumstances, we are said to argue EX PARI.

When we prove the truth of any proposition upon which, if proved, our opponent had agreed to admit the truth of the proposition in question, this is an argument EX CONCESSO.

When an argument is taken from the nature of things and addressed to the reason of mankind, it is called ARGUMENTUM AD JUDICIUM.

When it is borrowed from some convincing testimony, it is ARGUMENTUM AD FIDEM.

When it is drawn from any insufficient medium whatsoever, in confidence that our opponent has not skill to refute or answer it, this is ARGUMENTUM AD IGNORANTIAM.

When we prove a thing to be true, or false, from the professed opinion of the person with whom we dispute, it is named ARGUMENTUM AD HOMINEM.

When the argument is brought from the sentiments of some wise, grave, or good men, whose authority we reverence and hardly dare oppose, it is called ARGUMENTUM AD VERECUNDIAM, or AD MODESTIAM.

When we expose a man to hatred by alleging that his opinion has been held by some heretics or wicked men, calling him a Socinian, a Jacobin, or the like, it is ARGUMEMTUM AB INVIDIA DEDUCTUM.

And, lastly, when an argument is borrowed from any topics, which are suited to engage the inclinations or passions of the hearers on the side of the speaker, rather than to convince their judgments, this is ARGUMENTUM AD PASSIONES, or, if it be made publicly AD POPULUM.

CHAPTER III.

Of Sophisms.

SOPHISMS are false arguments, which have the appearance of being true.

The most remarkable of them are reduced by Logicians to the following heads.

1. IGNORANTIA ELENCHI, or a mistake of the question. As if, the question being put, *whether excess of wine be hurtful to those who indulge in it*, any one should argue, that wine revives the spirits, gives a man courage, and makes him more strong and active; and then take it for granted, that the point in debate is fully determined.

But what, it might be answered, is all this to the purpose? Wine, taken in moderation may have all these good effects which you ascribe to it; but the question is not, what are the effects of wine taken in moderation, but what are the effects of it when taken to excess.

2. Petitio principii, or a supposition of what is not granted; as,

There is no salvation out of the church:
Protestants are out of the church:
Therefore, Protestants cannot be saved.

The minor is here taken for granted, which is by no means to be allowed.

3. A circle is, when we prove one of the premises by the conclusion.

As if one were to reason thus:

The church being infallible, what she testifies must be believed:

But the church testifies, that the scriptures are the word of God:

Therefore, that the scriptures are the word of God, must be believed.

—and, on being asked how it appears that the church is infallible, should undertake to prove it, as follows:

The scriptures being the word of God, what they teach must be believed:

But the scriptures teach us, that the church is infallible:

Therefore that the church is infallible, must be believed.

In this way we might prove any thing.

4. NON CAUSA PRO CAUSA, or the assignation of a false cause: as if any one, when

an infectious disease is imported into a city, should impute the misfortune to the anger of God.

5. Fallacia accidentis; when we argue from what is true by accident, to what is true in the nature of things. So if opium, or the Peruvian bark, has been used imprudently, or unsuccessfully, so as to do injury; some absolutely pronounce against the use of the bark, or of opium, on all occasions, and are ready to call them poisons.

6. The next sophism borders on the former; and is, when we argue from that which is true in particular circumstances, to prove the same thing true simply, that is, abstractedly from all circumstances: this is called, in the schools, a sophism a dicto secundum quid, ad dictum simpliciter; as,

That which is bought in the shambles is eaten for dinner:

Raw meat is bought in the shambles;

Therefore raw meat is eaten for dinner.

This sort of sophism has its reverse, when we argue A DICTO SIMPLICITER AD DICTUM SECUNDUM QUID; or, to express it in English, from that which is true simply, or abstractedly from particular circumstances, to prove the same thing true when attended with such circumstances: as if a traitor should argue from the sixth commandment, *Thou shalt not kill*, to prove that he himself ought not to be hanged.

7. There are also sophisms of COMPOSITION and DIVISION.

A sophism of composition is, when we infer any thing concerning ideas in a com-

pounded sense, which is only true in a divided sense; as,

Two and three are even and odd;
Five are two and three;
Therefore five is even and odd.

A sophism of division is, when we infer the same thing concerning ideas in a divided sense, which is only true in a compound sense. As,

Five is one number;
Two and three are five;
Therefore two and three are one number.

Lastly, sophisms arise also from the ambiguity of words; and indeed several of the former fallacies might be reduced to this head. As if one should argue thus,

A church is a building of stone;

A religious assembly is a church;

Therefore a religious assembly is a building of stone.

Besides the special description of true syllogisms and sophisms already given, and the rules by which the one are formed and the other refuted; there are these two general methods of reducing all syllogisms whatever to a test of their truth or falsehood.

1. *One of the premises must contain the conclusion, and the other must show that the conclusion is contained in it.*

For the illustration of this, let us take the following example:

Whosoever is a slave to his natural inclinations is miserable;

A wicked man is a slave to his natural inclinations;

Therefore a wicked man is miserable.

Here it is evident, that the major proposition contains the conclusion; for under the general character of a *slave to natural inclinations, a wicked man* is contained or included; and the minor proposition declares it: whence a conclusion is evidently deduced that the wicked man is miserable.

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

For the greater part of the mistakes, which arise in forming syllogisms, is derived from some little difference in the sense of one of the terms in the two parts of the syllogism wherein it is used.

It is a sin to kill a man;
A murderer is a man;
Therefore it is a sin to kill a murderer.

Here the word *kill* in the first proposition signifies to kill unjustly, or without law; in the conclusion, it is taken absolutely for putting a man to death in general; and therefore the inference is not good.

What I am is a man;
You are not what I am;
Therefore you are not a man.

Here, *what I am*, in the major proposition, is taken *specially*, for my *nature;* but, in the minor proposition, the same words are taken *individually*, for my *person:* therefore the inference must be false; for the syllogism does not take the term *what I am* both times in the same sense.

He who says you are an animal, says true:

But he who says you are a goose, says, you are an animal:

Therefore he, who says, you are a goose says true.

In the major proposition the word *animal* is the predicate of an incidental proposition; which incidental proposition being affirmative, renders the predicate of it particular, according to the third axiom. And consequently the word *animal* there, signifies only *human animality*. In the minor proposition the word *animal* for the same reason signifies the *animality of a goose;* therefore it becomes an ambiguous term, and unfit to build a conclusion upon.

PART IV.

Of Method.

We have now done with the three first operations of the mind. There is yet a fourth, which regards the disposal and arrangement of our thoughts in such a manner as that their mutual connexion and dependence may be clearly seen; and this is what logicians call METHOD.

In unfolding any part of human knowledge, the relations of things do not always immediately appear, upon comparing them with one another. Hence we have recourse to intermediate ideas, and by means of them are furnished with those previous proposi-

tions that lead to the conclusion we are in quest of. And if it so happen, that the previous propositions themselves are not sufficiently evident, we endeavour by new middle terms to ascertain their truth; still tracing things backward, in a continued series, until at length we arrive at some syllogism where the premises are first and self-evident principles. This done, we become perfectly satisfied as to the truth of all the conclusions we have passed through, inasmuch as they are now seen to stand upon the firm and immoveable foundation of our intuitive perceptions. And as we arrived at this certainty by tracing our conclusions backward to the original principles from which they are deduced; so we may at any time renew it by a direct contrary process, if, beginning with these principles, we carry the train of our thoughts forward, until they lead us, by a connected chain of proofs, to the very last conclusion of the series.

Hence it appears, that, in disposing and putting together our thoughts (either for our own use,—that the discoveries which we have made may at all times be open to the review of our minds; or for the communicating or unfolding of these discoveries to others,) there are two ways of proceeding, equally within our choice. For we may so propose the truths relating to any part of knowledge, as they presented themselves to the mind in the manner of investigation; carrying on the series of proofs in a *reverse* order, until they at last terminate in first principles: or beginning with these principles, we may take the contrary way; and from them deduce, by a *direct* train of reasoning, all the several propositions we want to establish. This diversity, in the manner of arranging our thoughts, gives rise to the two-fold division of method established by logicians. For method, according to their use of the word, is nothing else than the or-

der and disposition of our thoughts relating to any subject. When truths are so disposed and put together, as they were or might have been discovered, this is called the ANALYTICK METHOD, or the METHOD OF RESOLUTION; inasmuch as it traces things backward to their source, and resolves knowledge into its first and original principles. When, on the other hand, truths are deduced from these first principles, and connected according to their mutual dependence, so that the truths first in order tend always to the demonstration of those which follow, this constitutes what we call the SYNTHETICK METHOD or METHOD OF COMPOSITION. The first of these has also obtained the name of the METHOD OF INVENTION; because it observes the order in which our thoughts succeed one another in the invention or discovery of truth: the other again is often denominated the METHOD OF SCIENCE; inas-

much as, in laying our thoughts before others, we generally choose to proceed in the synthetick manner, deducing them from their first principles.

THE END.

MAY 3 1994

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