ELEMENTS OF LOGIC:

ON THE BASIS OF LECTURES

BY WILLIAM BARRON, F.R.S.E.

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WITH

LARGE SUPPLEMENTARY ADDITIONS,

CHIEFLY FROM WATTS, ABERCROMBIE, BROWN, WHATELY, MILL, AND THOMSON.

EDITED AND COMPILED
BY
PROF. JAMES R. BOYD, D.D.,

AUTHOR OF ELEMENTS OF RHETORIC, EDITOR OF KAMES' CRITICISM AND OF ENGLISH POETS WITH NOTES, ETC.

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INTRODUCTORY OBSERVATIONS.

THE Lectures which constitute the basis of the present work were read by the learned author, during twenty-five sessions, in the University of St. Andrews, and may consequently be presumed to have been elaborated with great care, and to be worthy of the attentive study of all who desire to become acquainted with the science and the art of Reasoning.

As the Lectures are few and concise, there seemed to be occasion, in fitting them the better for a text-book in schools, or even for private perusal, to supplement them occasionally, from the works of distinguished writers on Logic, on points where, for practical utility, a more full discussion of the subject is needed; and also to introduce various important topics upon which Professor Barron had neglected to offer observations. As stated in the title-page, the works to which the compiler has had recourse for this purpose, are, chiefly, those of Dr. Isaac Watts, Dr. Abercrombie, Archbishop Whately, Dr. Thomas Brown, John Stuart Mill, and William Thomson. The contributions gained from these standard sources will be found at least equal in value, and nearly also in amount, to the Lectures. It is hoped, therefore, that a work has thus been constructed which will be found to possess some advantages over the text-books now most generally used. One peculiar feature of it, is the omission of a great deal of perplexing and useless matter relating to the Syllogism; and yet it presents a full discussion of the value and functions of that ancient form of rea-

soning. The opinions and views of distinguished authors on this interesting branch of the subject are largely quoted, that the student may be led to a discovery of the true state of the case. He is not, moreover, here subjected to the irksome task of learning a huge mass of intricate and unprofitable details about syllogistic Moods and Figures, such as are found in most treatises on the science of Logic.

The author of "The Philosophy of Rhetoric," Dr. George Campbell, not a mean reasoner, nor an indifferent critic in matters of this kind, in that celebrated work observes: "It is long since I was convinced, by what Mr. Locke hath said on the subject, that the syllogistic art, with its figures and moods, serves more to display the ingenuity of the inventor, and to exercise the address and fluency of the learner, than to assist the diligent inquirer in his researches after truth. The method of proving by syllogism appears, even on a superficial review, both unnatural and prolix. The rules laid down for distinguishing the conclusive from the inconclusive forms of argument, the true syllogism from the various kinds of sophism, are at once cumbersome to the memory and unnecessary in practice. No person, one may venture to pronounce, will ever be made a reasoner who stands in need of them. In a word, the whole bears the manifest indications of an artful and ostentatious parade of learning, calculated for giving the appearance of great profundity to what in fact is very shallow. Such, I acknowledge, have been, of a long time, my sentiments on the subject. On a nearer inspection, I cannot say I have found reason to alter them, though I think I have seen a little further into the nature of the disputative science, and consequently into the grounds of its futility."

After a series of observations made in vindication of these criticisms upon what he calls the scholastic art of disputation, Dr. Campbell concludes in the following terms: "When all erudition consisted more in an acquaintance with words, and

address in using them, than in the knowledge of things, dexterity in this exercitation conferred as much lustre on the scholar as agility in the tilts and tournaments added glory to the knight. In proportion as the attention of mankind has been drawn off to the study of Nature, the honors of this contentious art have faded, and it is now almost forgotten. There is no reason to wish its revival, as eloquence seems to have been very little benefited by it, and philosophy still less. Nay, there is but too good reason to affirm that there are two evils, at least, which it has gendered. These are, first, an itch of disputing on every subject, however incontrovertible; the other, a sort of philosophic pride, which will not permit us to think that we believe any thing, even a self-evident principle, without a previous reason or argument. In order to gratify this passion, we invariably recur to words, and are at immense pains to lose ourselves in clouds of our own raising. We imagine we are advancing and making wonderful progress, while the mist of words in which we have involved our intellect hinders us from discerning that we are moving in a circle all the time."—(*Philosophy of Rhetoric*, p. 92.)

Of the ancient Logic (which Archbishop Whately and others have endeavored to revive), the same views were entertained substantially by Dr. Thomas Reid and Dr. Adam Smith, Professors of Moral Philosophy in the University of Glasgow, and by Professor Dugald Stewart, of the University of Edinburgh. One of the pupils of Dr. Adam Smith, and who was ranked among his most valued friends during life, makes the following significant statement: "In the Professorship of Logic, to which Mr. Smith was appointed on his first introduction into the University of Glasgow, he soon saw the necessity of departing widely from the plan that had been followed by his predecessors, and of directing the attention of his pupils to studies of a more interesting and useful nature than the logic and metaphysics of the schools. Accordingly, after exhibiting a gen-

eral view of the powers of the mind, and explaining so much of the ancient logic as was requisite to gratify curiosity with respect to an artificial method of reasoning, which had once occupied the universal attention of the learned, he dedicated all the rest of his time to the delivery of a system of rhetoric and belles-lettres." — (*Dugald Stewart's Account of the Life and Writings of Adam Smith*, *Works*, vol. vii. pp. 8, 9.)

The same view of the subject was expressed by Lord Kames, in his "Progress of Reason:"—"Aristotle," he observes, "has done hurt to the reasoning faculty, by drawing it out of its natural course into devious paths. His artificial mode of reasoning is no less superficial than intricate. I say superficial; for in none of his logical works is a single truth attempted to be proved by syllogism that requires a proof. The propositions he undertakes to prove by syllogism, are all of them self-evident. Take, for instance, the following proposition: That man has a power of self-motion. To prove this, he assumes the following axiom, upon which, indeed, every one of his syllogisms is founded, viz.: That whatever is true of a number of particulars, holds true of every one separately; which is thus expressed in logical terms: Whatever is true of the genus, holds true of every species. Founding upon that axiom, he reasons thus: 'All animals have a power of self-motion: man is an animal: *ergo*, man has a power of self-motion.' Now, if all animals have a power of self-motion, it requires no argument to prove that man, an animal, has that power; and, therefore, what he gives as a conclusion, or a consequence, is not really so: it is not *inferred* from the fundamental proposition, but is *included* in it. At the same time, the self-motive power of man is more clearly ascertained by experience than that of any other animal; and, in attempting to prove man to be a self-motive animal, is it not absurd to found the argument on a proposition less certain than that undertaken to be demonstrated? What is here observed,

will be found applicable to the bulk, if not the whole, of his syllogisms."

The views of Dr. Thomas Brown, of the University of Edinburgh, correspond substantially with those above given, and will be found in the latter part of this volume. These are followed by a more profound discussion of the subject by Mr. Mill, who in part sustains, and in part dissents from, the statements and reasonings both of the writers just referred to and of our author. Yet on the whole, perhaps, he has presented the most satisfactory explanation of the exact value and limited functions of the famous Syllogistic Process. Other portions, also, of this work have been greatly enriched by contributions derived from the same author.

The method of treating the general subject, which Professor Barron has in the following Lectures pursued, seems to be philosophical, and well adapted to secure all the most valuable ends of Logic, *in a large and popular sense of that term.* He first discusses every topic *introductory* to the art of reasoning. He explains the manner in which we receive Ideas, the sources from which they are derived, and the methods we must employ to render them clear, adequate, and conclusive. He then explains the nature of the propositions into which they may be formed, and the judgments which we must pass on these propositions. He delineates the prejudices which pervert our judgments, and lays down some rules which we must follow, in order to form them with accuracy and justness. He then treats of Reasoning, or the method of ascertaining propositions by means of intermediate ideas, or proofs, whether demonstrative or probable. He explains the different methods, in common use, of distributing or arranging ideas in different processes of reasoning. The principal kinds of Sophistry, or False Reasoning, are subsequently brought to view (which, however, are more fully considered in the pages we have drawn from Dr. Abercrombie). The author concludes with an exposition of the

nature of the Syllogistic Process, and of its great want of utility, for all the legitimate purposes of reasoning in common life.

From the treatise of the learned *Dr. Watts* have been drawn some valuable observations on Prejudices, and on Fallacies in Reasoning; also, some important Principles and Rules of Judgment, in matters of Reason and Speculation, of Morality and Religion, of Human Prudence, of Human Testimony, and of Divine Testimony. He has supplied us, also, with some excellent Rules of Method in Reasoning.

The pages drawn from the work of *Dr. Abercrombie* (on the Intellectual Powers) are regarded as possessing uncommon value. They instruct us how we may examine and test the validity of a process of reasoning: they expose the most common fallacies that are practised in reasoning: they enable us to distinguish the sound exercise of judgment from the art of ingenious disputation; and they contain some admirable remarks upon the due culture and regulation of the judgment, showing its important applications, alike to the formation of opinions and the regulation of conduct. While some of these topics do not fall within the narrow limits of the *Ancient* Logic, they possess an admirable fitness to prepare the mind for logical investigations, and deductions, and communications, as well as for a rational course of action.

To *Archbishop Whately* this volume is much indebted, not for what has been taken from his *Logic*, but from the First Part of his work on Rhetoric, which, for all the practical purposes of life, in matters of reasoning, is far more valuable than the other work. The best thoughts which he has therein communicated on the subject of reasoning have been selected, and introduced into the present work, and will be acknowledged to be worthy of diligent study and attention.

To the additions already named has been appended, as interesting, and not inappropriate, a brief illustration of the *Socratic method of Reasoning.*

These additions, which are either distributed through the Lectures or appended, may readily be distinguished from them by being included in brackets, or by a distinct announcement being made.

The last three Lectures of the original work of Professor Barron, embracing a general view of human knowledge, or of the sciences and arts which are proper objects of investigation, have been omitted in this volume, as not peculiarly appropriate to a work on Logic. Some portions of the other Lectures, also, of a local character, or of not sufficient pertinency and importance, have been omitted, and occasionally a verbal correction has been made. The Editor has, further, taken the liberty of indicating by the Italic character the prominent topics—has prepared running titles at the top of the page, and arranged the matter of the Lectures under two forms of type, that the illustrative and also the less important parts might be more readily discerned,—thus adapting the Lectures to more convenient use in the class-room, or for private reading.

What Mr. Thomson has so well said in the conclusion of his able work on the Laws of Thought, the compiler of the present work would here introduce, as conveying an important admonition to those who would derive from it the greatest amount of benefit which it is designed and suited to confer. He says: "If this little work is hastily examined and cast aside, of course the reader will not have become a logician; he will have learned the unimportant fact that upon this or that disputed doctrine the author held this or that opinion, and his knowledge will go no further. Instead of learning Logic, he will know an insignificant fact in logical history. The mistake is not uncommon:—we inquire what Aristotle and Bishop Butler said on morality, and think that we have studied Moral Philosophy; we read the *Organon*, and call ourselves logicians. History presides over these and other facts: we are in *her* domain when we use our books in this narrow spirit. Philosophy does not

exist until the mind of the student begins to work for itself with the principles it receives historically; to decompose and to compose anew, to criticise the arguments employed, to essay at least to push the confines of Truth further into the wilds of error and ignorance, and to leave her a wider territory."

"If Grammar is learnt by speaking and writing; if a man cannot become an orator without repeated efforts to speak in public, nor a poet without practising the mechanism of verse, till he can use it with ease, it seems absurd to expect that a course of lectures heard, with a string of definitions learnt, will make a logician. Let those who wish to possess the intellect they have received from above in the depth and clearness, the sober composure, the calm activity which a high degree of culture can alone bestow, venture to study Logic in a larger spirit than the merely historical."

Having thus stated the general design, and glanced at the more prominent topics considered in this volume, and having noticed some of the various enlargements and improvements, which have been attached to the original Lectures that form the basis of the present work, the Editor sends it forth on a mission of usefulness among the Academies, Female Seminaries, and Colleges of this Western Hemisphere, with the earnest desire that it may be found eminently serviceable in forwarding the cause of Truth, and in promoting a sound and useful education.

J. R. B.

NOTE TO THE SECOND EDITION.

THE value of the work has been increased by some verbal corrections; but especially by adding a section on Induction and Deduction, from Thomson's Laws of Thought.

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INTRODUCTION.

BY PROFESSOR BARRON.

Some people imagine that Logic is a frivolous, an ostentatious, at best an unnecessary art, which may serve to puzzle and perplex, but can be of little utility in business or philosophy. Others are perhaps of opinion, though it were more useful than it is, yet it requires a study so dry and uninteresting, so abstract and difficult, that few inquirers have patience to make any progress in it, or to convert it to any advantage.

Were the system I have to lay before you composed of the idle syllogism of the schools, which till lately was the only system taught in our colleges, I should not have confidence to maintain, that there was not a great deal of foundation for the first objection. In the short account of that system which I have to advance, I believe it will appear, that it is a vain and unavailing instrument of truth and knowledge.

But, though the syllogism of the schools, and the old art of logic, be admitted to be idle systems, yet we surely have more candor than to infer, that there is no art at all in reasoning; that there is no such thing as good reasoning; or that it is of little use to be a good reasoner. I, on the contrary, will take for granted, that there is no accomplishment or qualification any man can acquire more important. Whether, then, you become in life men of speculation, or men of business, in every step you take, your rational faculty must be con-

stantly exerted; and the following lectures are calculated entirely to render you expert and successful in that exercise.

As to the second objection, that the study is uninteresting, dry, and difficult, the proper answer is, that it is no more so than every exercise of the understanding naturally is, and must be. There is nothing in it either so uninteresting, so dry, or so difficult, which any person possessed of ordinary capacity may not easily surmount, and which every person must surmount, who expects to acquire, either in philosophy, literature, or business, as much use of his understanding as to attend to any train of thought. It is by the proper use of his understanding that man attains his eminent characteristic of being rational. It is by the proper use of his understanding that he can make any progress in knowledge. It is by the same means only that he can obtain the flattering distinctions claimed by superior judgment, and by which he can avoid the disgrace attached to ignorance and stupidity. In a word, to all orders of men, true logic pretends to lend the most salutary aid. Her pretensions are at least commendable, and her efforts are entitled to the most patient reflection and candid examination.*

[* Whatever has at any time been concluded justly, whatever knowledge has been acquired otherwise than by immediate intuition, depended upon the observance of the laws which it is the province of logic to investigate. If the conclusions are just, and the knowledge sound, those laws have actually been observed. We need not, therefore, seek any further for a solution of the question, so often agitated, respecting the utility of logic. If a science of logic exists, or is capable of existing, it must be useful. If there be rules to which every mind conforms in every instance in which it judges rightly, there seems little necessity for discussion whether a person is more likely to observe those rules, when he knows the rules, than when he is unacquainted with them.—*Mill's Logic.*

ELEMENTS OF LOGIC.

LECTURE I.

OBJECT OF LOGIC—OPERATIONS OF THE MIND—IDEAS—SIMPLE AND COMPLEX—DISTINCT AND OBSCURE.

THE object of education is to increase knowledge, to refine imagination, to improve taste, and to prepare us for acting a part in life, respectable and useful in itself, as well as advantageous and honorable to the public.

The professed *purpose of logic* is to teach the right use of reason, both in the investigation and in the communication of truth; to inform us how to introduce clearness and good order among our ideas; to explain the operations of the mind, which are conversant about them; and to guard us, in performing these operations, against falling into error.*

The understanding is occupied entirely about knowledge. The end of all science is to instruct us in knowledge; and the same end is pursued by all study, whether prudential, political, moral, or mechanical. In whatever way we exert our understanding, it is to obtain some information we did not possess before;

[* Logic, accurately defined, is the art of thinking and reasoning justly: it traces the progress of our knowledge from our first and most simple conceptions through all their different combinations, and all those numerous deductions that result from variously comparing them with one another.—*London Cyc.*]

and the design of the art of logic is to hold forth the manner of attaining that knowledge with most ease and expedition.

From these views of the nature and end of logic, it is apparent that it is one of the first arts to which we should apply our attention in our progress towards knowledge, as affording the best means of fortifying and improving our understanding. The more acute the understanding is, it will be more successful in the investigations of science. The less it is liable to err, the more certain and expeditious will be its progress. The more we are acquainted with those prejudices and partialities which have misled other reasoners, the less danger of mistake will there be. The better we understand the nature of the instrument we employ, the more expert and successful may we reasonably expect to be in the use of it. Every thing, then, in logic, that does not contribute to improve the understanding, and to promote our progress in useful knowledge, I shall not hesitate to pronounce unworthy of attention; but every thing, on the other hand, that promotes these ends, cannot obtain more attention than it deserves.

I am well aware that no art ever gave occasion to so much idle research, and fanciful refinement, as that of which I now speak. No art has so much bewildered and repressed every useful exertion of the understanding, as that which pretended to enlighten and improve this faculty, and to guide it in the road to truth. All the efforts of human genius, all the learning which for many centuries prevailed in Europe, were subtle disquisitions and puzzling distinctions about the method of investigating knowledge, without applying that method to any important inquiry. All the syllogism of the schools, after the thousands of volumes that have been written upon it, and after the employment of a

series of ages to bring it to perfection, never enriched science or business with one useful discovery.

Let us not, however, rashly conclude, that these abuses furnish a proof of the general inutility or insignificance of the art to which I now call your attention. It is curious even to survey the ingenuity with which so many men have gone wrong, with the endless perplexities in which they have involved themselves. To point out these is one of the purposes of this work; but it is of more substantial utility to learn the nature of truth, and the operations of the human mind, which are concerned in the discovery and extension of knowledge.

As the sophistry, then, and absurdity, with which logic has been disgraced, are no valid objections against the use of it, so neither is the argument, that many men reason often very justly without any acquaintance with its rules. There is in all mankind some natural logic, for it is one of those arts which may be learned by practice, without the knowledge of theory. One of the best methods of making progress in the art of reasoning, is actual practice, or the acquisition of the habit of examining a train of ideas that constitute an argument; and of this branch of the art all men acquire some share by experience; many men acquire a great deal. But, though long experience in sound reasoning may render us expert logicians, in the same manner as practice, without the knowledge of principles, may form eminent practitioners in any other art; yet this success will not justify any inference against the utility, or even the propriety of theory. The end of all theory in the arts is to render us more methodical and reputable performers, and it can scarcely fail to produce this effect, when properly applied.

What is the theory of an art? It is a philosophical

delineation of the principles on which the art is founded, of the end it has in view, and of the means by which it proposes to accomplish that end. From this delineation are deduced the rules of the best practice, which are commonly illustrated from the experience of the most successful practitioners. A theory of an art, then, is a collection of all the knowledge which can be obtained concerning that art, from the combined information of all preceding theorists and practitioners. It points out the most patent and direct road to success, and it marks all the corners and obstructions, at which improper deviations are most likely to be committed; so that, after having learned the theory, nothing remains but to obtain the habit of ready and accurate practice, in order to render us able and successful performers.

Although, then, many men are good reasoners who never learned logic, yet the knowledge of that art may be neither superfluous nor nugatory; because an acquaintance with it may either facilitate our progress in becoming good reasoners, or may enable us to reach greater eminence in that line, than those who have not enjoyed the advantages we possess; and if we acquire by it either of these emoluments, it is of too much importance not to attract our serious attention.*

[* Logic has its use in improving the condition of men: it teaches, or may be made to teach, them to think. The active intellect has two parts, one of which originates our thoughts, and may be called the suggestive, whilst the other checks and judges thoughts as they arise, and may be called the critical power. Thoughts are continually suggested without the consent of the will. The suggestive power may be educated as certainly as, though more gradually than, the critical. The discovery which we call a flash of genius, a happy thought, really depends as much upon previous acquirements, as the power of stating a case or applying a rule does. All discipline of the suggestive must proceed from the critical power: it is by a long, careful, patient analysis of the reasonings by which others have attained their results, that we learn to think more correctly ourselves. He who reads over a work on logic probably thinks no better when he rises

As the object of logic is to teach the best use of our rational faculty, both in investigating and in communicating truth, the theory of it, and the materials of which that theory consists, are deduced from this end. That *theory*, accordingly, consists of *two parts;* the nature of ideas, which are the materials on which we reason, and the nature of the faculties or operations of the mind which are concerned in reasoning. (Before we can reason, we must have ideas; and before we can reason rightly, we must understand what kind of operation reasoning is.) The explication of both comprehends the whole of logic which is of any use.

In explaining the nature of ideas, and of the operations employed about them, one of two methods must be adopted. We must either treat them separately, or in conjunction. We must either first discuss the ideas, and then the operations, or we must carry on the account of both at the same time. The latter is the better method, because one of the chief means of explaining the nature of ideas is, to point out the operations of which they are the objects; and one of the chief means of illustrating the operations is, to present the single ideas, or the clusters of ideas, about which the operations are exerted. This latter method we cannot hesitate to follow; and, in adopting it, all we have to do is, to specify and illustrate the operations from experience, and then to explain the single ideas, or the collections of ideas, about which each operation is conversant.

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up than when he sat down; but if any of the principles there unfolded cleave to his memory, and he afterwards, perhaps unconsciously, shapes and corrects his thoughts by them, no doubt his whole powers of reasoning gradually receive benefit. In a word, every art, from reasoning down to riding and rowing, is learnt by assiduous practice, and if principles do any good, it is proportioned to the readiness with which they can be converted into rules, and the patient constancy with which they are applied in all our attempts to excel.—*Thomson.*]

The *operations employed in the investigation of truth* are commonly reckoned three—perception, judgment, and reasoning. By *perception* is understood that operation by which the mind sees and becomes acquainted with every single idea it possesses. By *judgment* is understood that operation by which the mind discovers the agreement or the disagreement of any two ideas it may have occasion to compare, in order to discover truth and knowledge. By *reasoning* is understood that operation in which the mind compares two ideas by means of one or more intermediate ideas, in order to discover the amount of what is commonly called a demonstration or an argument. This short account of these operations must at present suffice; for, as they comprehend the whole theory of logic, I am afterwards to resume and consider them separately.*

Ideas are arranged into classes, and different names assigned, according as they are simple or complex, distinct or confused, adequate or inadequate, particular or abstract.

A *simple idea*, as its name insinuates, can be contemplated only in one view. It cannot be divided or taken to pieces, because it does not consist of parts, being naturally indivisible.

Most of our ideas of the qualities of bodies are of this class—as hard, soft, round, smooth, white, black, cold, hot; all ideas, perhaps, of tastes, smells, sounds—as bitter, sweet, low, loud; and many of our ideas of the feelings and operations of the mind—as of desire, aversion, hunger, pain, thinking, willing, discerning, reasoning.

[* Mr. Thomson distributes the subject into three parts, the first treating of conception, or the power of forming general notions; the second of judgment, or the power of deciding whether two notions agree or not, and the third of syllogism, or the power of drawing one judgment from another. To these a fourth part, in which method, or the power of using the other three functions in the discovery of truth, is explained, has been usually added, which answers to applied logic.]

We cannot divide them, even in imagination; they are perfectly uniform, and void of parts.

A *complex idea* contains two or more simple or subordinate ideas, into which it may be divided, and which subordinate ideas, when divided, may be considered separately. All our ideas of substances are complex, as of animals, vegetables, and the inanimate parts of nature.

The idea of a tree, for instance, includes a great variety of subordinate ideas—those of wood, stock, roots, branches, vegetable life, shape, leaves, bark, blossoms, fruit; several of which subordinate ideas may be subdivided into other ideas. All ideas of figures—as of circles, squares, triangles, cubes, cylinders, pyramids; most of the ideas of virtues and vices—as of justice, fortitude, veracity, theft, ingratitude, falsehood, deceit.

The *second division of ideas* was, into *distinct* and *confused*, or, which is much the same thing, into *clear* and *obscure*. Distinct or clear ideas are those of which we have full and perfect comprehension, and which we can readily separate or distinguish from all other ideas. Confused or obscure ideas are those of which we have not full and perfect comprehension, and which we cannot easily separate or distinguish from all other ideas. Distinct and clear ideas are perceived with a perspicacity and energy similar to that by which the mind contemplates figures in mathematics, or numbers in arithmetic; all their boundaries and their differences are completely discernible. Confused or obscure ideas are like the colors of a rainbow, they run into one another, and the mind neither perceives fully their nature nor their limits.

The acquisition of clear and distinct ideas is of the utmost consequence in the investigation of knowledge; for the degree of conviction with which it is presented to the mind, is always in proportion to the degree of

clearness and distinctness which we have introduced among our ideas. Were all our ideas clear, all our knowledge would be demonstrative, a quality which belongs only to our scientific knowledge. Obscurity, more or less, adheres to all our other ideas, and leaves us only greater or less degrees of probable evidence, corresponding to the less or greater obscurity of our ideas.

In the mathematical sciences, and in arithmetic, the evidence is demonstrative, because our ideas of all the figures and numbers about which we reason are perfectly clear and distinct, and because, in comparing them, we perceive accurately whether they agree or disagree; and if they disagree, how great the excess of one is above another, so that we can affirm, either that they are equal, or that the one exceeds the other by a certain quantity.

In morals, in politics, in arts, and in business, almost all our ideas are more or less obscure; hence, in comparing them, we cannot precisely pronounce whether they agree or disagree; and though we were sure that they disagree, yet we cannot accurately ascertain the difference. The necessary consequence is, that in all these branches of knowledge, we can obtain no demonstrative evidence for truth. We must be satisfied with probable evidence, and we should be attentive to procure ideas as clear and distinct as possible, that we may reach the highest degree of probability.

I shall not at present pursue farther the doctrine of distinct and obscure ideas; a future opportunity will occur of discussing more completely this important subject. I shall then have occasion to point out the caution with which we should proceed in the examination of our ideas, the prejudices by which they are obscured, but particularly the attention we must employ to prevent the confusion which may be introduced among them by the improper use of words. From these views, the important and extensive utility of logic will appear, and how deeply its rules and principles enter into all our inquiries and knowledge.

LECTURE II.

IDEAS—ADEQUATE AND INADEQUATE—PARTICULAR AND ABSTRACT—RULES CONCERNING IDEAS.

THE *third division of ideas* related to their being *adequate* or *inadequate*. An adequate idea is a perfect picture of its archetype, or contains a representation of all the parts of which the archetype (or object) consists. It is different from a distinct idea, because an idea may be distinct and not adequate; that is, we may have a clear perception of all the parts of an idea, as far as these parts extend, though these parts may not constitute a complete collection of those of the archetype.

We may have, for example, a distinct idea of a triangle, and yet not possess an adequate idea of a right-angled triangle, an isosceles, or scalenum—which, besides the general ideas of three sides and three angles, require that the sides and angles should be of a particular species. An inadequate idea is not a perfect picture of its archetype, or contains not a complete representation of the parts of which the archetype consists.

Almost all simple ideas are adequate, as those of colors, tastes, or qualities; all ideas of mathematical figures, and of numbers, as triangles, squares, cubes, cylinders, fifty, a hundred, a thousand, ten thousand But although, when we examine archetypes with attention, ideas will be as adequate as we can make them; and when knowledge is either demonstrative or even highly probable, ideas must really, or very nearly, be adequate; yet if we compare ideas, not only with what we know of their archetypes, but with what may be known of them, and perhaps is known of them by supe-

rior beings, few of our ideas, except those of mathematics and arithmetic, will be found to be adequate.

There is hardly any other thing in nature, of which our knowledge is complete. We are acquainted with a few only of the properties of animals, vegetables, and inanimate matter; what substance is, whether of matter or spirit, is totally beyond our comprehension.

The whole system of the transmutation, or the assimilation of nature, by which the nutriment of animals is converted into the different parts of which their bodies consist, bones, flesh, sinews, blood, hair, horn, &c., and by which inanimate nature is converted into the numerous parts of vegetables and metals, seemingly so different from one another, as trees, shrubs, leaves, bark, blossoms, fruit, gold, silver, mercury, &c., is to us altogether unintelligible.

In all these cases, and in many others which might be mentioned, our ideas are unavoidably inadequate. But fortunate would it be if our ideas were always adequate, or as near to adequate as possible, when it is in our power, by industry and attention, to make them so. They are less adequate than they might be, chiefly from two causes—first, carelessness in the examination of archetypes, which overlooks some of their properties or parts; and, secondly, inattention in ascertaining the meaning of the words employed to denote them, which words often do not express the same parts, or all the parts, in our minds, which they do in the minds of others. In both cases, our knowledge cannot be so complete as that of a person who has taken care to prevent these errors or defects; and in every discourse or controversy with that person, we must misunderstand him when these words occur.

The *last distinction of ideas* considers them as *particular* or *abstract.* This is the most important distinction, as it enters deep into the constitution both of language and knowledge. All things exist in nature

as individuals or particulars. Every substance is that of some particular animal, vegetable, or inanimate piece of matter. Every material quality, as hard, smooth, rough, black, white, belongs to some substance or body, without which the quality cannot subsist. Every virtue or vice has always relation to some agent; and though we may speak, speculate, or reason concerning them separated from this agent, yet we must admit that, independent of him, they have no actual existence, nor any existence except in idea.

Particular ideas represent individuals as they exist in nature, as a house, a horse, a man, a tree, for which, perhaps, we have no names, or to which we give the names of St. James's, Bucephalus, Alexander, or the Royal Oak. Ideas, however, would be in number infinite, and communication, of course, would be impracticable, if every individual thing with which we are acquainted were to require an idea and a name to denote it. To surmount this obstacle, the mind is very fortunately endowed with the faculty called abstraction, by which it arranges into classes all the individuals which have any common qualities, or which have any thing similar, either in their figure, existence, or action. It assigns a *general idea and name* to each class, and takes the trouble, only when compelled so to do, to specify individuals, to distinguish them in the mind by ideas, and in language by names.* Ideas and language, by this expedient, are rendered exceedingly manageable and convenient; for the individuals of

[* A *general name* is one which is capable of being truly affirmed, in the same sense, of each of an indefinite number of things.

An individual or *singular name* is a name which is capable of being truly affirmed, in the same sense, only of one thing.

A *class* is the indefinite multitude of individuals denoted by a general name.—*Mill's Logic*, p. 18.]

which it is necessary to form ideas and fabricate names are not very numerous, being limited chiefly to the human race. It was much more necessary to assign ideas and names to the individuals of this class, than to assign ideas and names to all the individuals of all the classes in nature, while the expedient of giving a general name is equally convenient for the purposes of communication.*

This power of forming an idea of a class of objects, is called abstraction, for the following reason: The *idea of a class* contains only those parts or qualities which are common to all the individuals of the class; while the qualities peculiar to any individual are left out, or abstracted from those which constitute the general idea of the class.

The general or abstract idea, for example, of the class of vegetables called trees, contains the following parts: a plant of considerable height, which sets out large branches, is clothed with bark, and in summer bears leaves and seeds. All the plants that can be called trees have these qualities; and in forming an idea of these qualities, the mind abstracts its attention from all the qualities which are peculiar to any particular tree, such as the size and direction of the branches, the nature of the wood, the color, surface, and shape of the bark, and of the leaves, and the nature and properties of the seeds, such as berries, acorns, apples, pears, &c Again, the general idea of a horse contains the idea of a large and beautiful quadruped, of cylindrical body, high-set neck, taper limbs, swift, strong, useful, docile; but it includes not the ideas of shape, color, size, pleasure, or utility, which distinguish individuals, the race-horse, the hunter, the war-horse, or the horse of the plough.

[* The notions formed in the mind from things offered to it, are either of single objects, as of "this pain, that man, Westminster Abbey;" or of many objects gathered into one, as "pain, man, abbey." Notions of single objects are called intuitions, as being such as the mind receives when it simply attends to or inspects (*intuetur*) the object. Notions formed from several objects are called conceptions, as being produced by the power which the mind possesses of taking several things together (*concipere*, i. e., *capere hoc cum illo*). They are also called general notions —*Thomson.*]

The mind is not satisfied with forming one grade of classes, which may comprehend individuals. It generalizes much further, with the same view of simplifying and facilitating the means of communication and knowledge, and of abridging the number of ideas and words. It constitutes classes above classes. Accordingly, it forms a *second class*, containing the properties which one first class has in common with other first classes, so that the first class is now considered as making only one of the constituent parts of the second class.

The class of creatures *called men*, for example, comprehends what qualities are common to all its individuals, Romulus, Alexander, Julius Cæsar. But the class of men has many common qualities with other classes of living creatures, horses, dogs, sheep, fishes, fowls, &c., namely, life, motion, shape, color; and hence, of these common properties is framed a higher class, called that of *animals*, which contains the qualities common to all living creatures.*

The mind sometimes ascends higher, and forms *another class more general*, of all the properties which this second class has in common with other classes in nature. For example, animals have several properties in common with vegetables, as shape, color, growth, decay, circulation of juices; of these is formed a *third class*, called *animated nature*. We may proceed further still to form a *fourth class*, which will contain all things,

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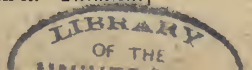
[* By observing John, Thomas, and Peter, and abstracting from their accidents the essential marks, we get the notion of man; but again, by comparing the conception man with other conceptions, cow, sheep, wolf, whale, and observing the mark common to all, that they suckle their young, we form the wider conception mammalia,—wider, because it includes man and many other conceptions. We may carry the process further still; and, with writers on Natural History, compare the mammalia with aves, amphibia, pisces, insectæ, and vermes, when we shall discover that all these, however different, agree in having life and sensation, from which marks we gain the new conception animal, wider than any of the former, as including them all,—higher, as requiring a second step in the abstractive process to reach it.—*Thomson.*]



animate and inanimate. The properties, however, of it are very few, and scarcely amount to more than existence and figure.

Though all these steps of generalizing are sometimes necessary or useful, yet knowledge and language seldom require attention to more than three of them; namely, the individual, the first class, and the second. The first class is called the *species*, the second the *genus*. Thus, Alexander is the individual, man is the species, and animal is the genus; the royal oak is the individual, tree is the species, and vegetable is the genus; St. James's is the individual, dwelling-house is the species, edifice is the genus. The third and fourth classes are also denominated *genera*. The second class, or the one immediately above the species, is called the *proximate genus*, the third and fourth classes are called *transcendent genera*. The proximate genus of the species man is animal; existence is the transcendent genus. The proximate genus of tree is vegetable; the transcendent may be animated nature, or existence.*

It is to be observed, though general or abstract ideas are more comprehensive, or extend to more objects, than particular ideas, yet that they are less complex, or contain fewer parts, and that *the more general they are, the less complex they are*, or contain fewer parts in pro-

[* The same class which is a genus with reference to the sub-classes or species included in it, may be itself a species with reference to a more comprehensive, or superior, genus. Man is a species with reference to animal, but a genus with reference to the species, mathematician. Animal is a genus, divided into two species, man and brute; but animal is also a species, which, with another species, vegetable, makes up the genus, organized being. Biped is a genus with reference to man and bird, but a species with respect to the superior genus, animal. Taste is a genus, of which, sweet taste, sour taste, &c., are species; but taste is a species of the genus, sensation. Virtue, a genus with reference to justice, temperance, &c., is one of the species of the genus, mental quality.— *Mill's Logic*, p. 82.]

portion. The reason is exceedingly obvious. A genus contains only the few properties which are common to the several species which it includes, and which are not nearly so numerous as those that belong to each species. The species, again, contains the properties which are common to all the individuals it includes, and which are not so numerous as those that pertain to each individual. The *genus* animal, for instance, includes few properties, life, shape, color, motion, growth, decay. The *species* man contains all these properties of the genus, besides those of the species, namely, power of speech, thinking, acting with design, and many others. The *individual* contains all these qualities I have enumerated, both of the genus and of the species, together with those peculiar to the individual, wise or prudent, knowing or ignorant, rich, poor, fortunate, unfortunate,—all these qualities, however variable, and in a particular degree corresponding to the nature or character of the individual.*

[* *Extension and Intension.* When we compare a vague and general conception with a narrower and more definite one, we find that the former contains far more objects in it than the latter. Comparing plant with geranium, for example, we see that plant includes ten thousand times more objects, since the oak, and fir, and lichen, and rose, and countless others, including geranium itself, are implied in it. This capacity of a conception we call its extension. The extension of *plant* is greater than that of *geranium*, because it includes more objects.

But conceptions have another capacity. Whilst plant has more objects under it than geranium, it has fewer marks in it—fewer properties by which we assign it a place under some appropriate conception. I can describe the leaves petals, stamina, and pistils of *geranium*, but of *plant* no such description is possible. I cannot say that every plant has a stem, for there are the lichens to contradict me; nor a flower, for ferns have none, and so on. I can say little more about *plant*, than that all plants have growth and vegetable life. The logical expression of this defect is, that its intension is very limited.

The greater the extension, the less the intension; the more objects a conception embraces, the more slender the knowledge which it conveys of any of those objects; and *vice versa*.

With the help of the important distinction between extension and inten-

The power of abstraction is one of the most important belonging to the understanding, and the practice of it in science and in business is of the most extensive use. It will afterwards be explained, that all *definitions* are regulated by the arrangements of abstraction, and that they consist entirely in referring an individual to its species, with the addition of some quality which distinguishes it from the other individuals of its species; or in referring a species to its genus, with the addition of some quality which characterizes it as a species.

To evince the exceedingly extensive *utility of abstraction*, I must observe, that all science, almost all reasoning, indeed almost all the words of language, are conversant about abstract ideas. You will readily apprehend, that the two sciences of quantity, mathematics and arithmetic, are occupied entirely about abstract ideas.

No property is demonstrated of any triangle in the elements of geometry, that is not true of all triangles, at least all triangles of the same kind. The figure delineated on the board of the mathematician is not particular or local; it represents every figure of the same species, and the demonstration is equally extensive in its application, namely, to all figures of the species. Were not this the case, science would have no existence, and the mind of man could make no progress in knowledge. Were not this the case, the mathematician would be obliged to demonstrate the properties of every particular figure he should employ, and all progress in knowledge would be suspended, because the new figures of the same species which may occur are infinite.

All the operations in arithmetic, the objects of which are dis-

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sion, or as others express it, the *sphere* and *matter* of the conception, we can understand the meaning of the saying, that the subject of a judgment is in the predicate, and the predicate in the subject. "Man is an animal:" this conveys two notions, that *man* is contained in *animal*, as a species in a genus; and that whatever makes up our notion of animal—all the marks of animal—are contained in man. So they are mutually contained. Instead of "man is an animal," Aristotle would say "animal inheres in man."—*Thomson.*]

creted quantity, or quantity divided into parts, are of a general nature, and all the truths they establish are of the same denomination. The capital operations of addition and subtraction, into which all others in arithmetic are resolvable, however apparently removed from them, respect not the comparison of any two individual parts of divisible quantity; the conjunction of both in one total, which is the object of addition, or the disjunction of the quantity by which the greater exceeds the lesser, which is the object of subtraction They are of a general nature, and are applicable to all cases whatever, in which quantity is divisible and separable.

In like manner, inquiries in morals, concerning virtues and vices; in politics, concerning legislation, and the happiness of communities; in arts, concerning beauty and utility; in business, concerning propriety, decency, wisdom, and interest; are all of an abstract nature, and are theories established by argumentation and experience, which every individual applies to his particular case, according to his best judgment.

We must not, however, conclude, that no reasoning is competent about particular ideas or individuals. The agreement or disagreement of ideas, in which knowledge consists, is equally perceptible in particular ideas as in general ones; and we can reason as well about one man, one tree, or one triangle, as about the species or genus of these individuals. But all particular reasonings are confined to the cases to which they are applied; and, of course, as they are of very limited use, we avoid them as much as possible, and rather seek for general theories, in which particular cases may be included. In a word, all the appellative nouns of language are significant only of abstract ideas, so that there is hardly a topic about which we can either speak or write, that is not the offspring of abstraction.

As abstraction is the capital operation by which ideas are prepared for reasoning, and by which reasonings become of extensive use, so it is the operation by

which man is most eminently distinguished above the inferior animals.

We cannot doubt that the inferior animals possess particular ideas, and that they even deduce inferences from them; that they are endowed with a power of recalling them, and of forming associations among them. The horse recollects, and discovers a manifest inclination to revisit the house where he has formerly been well used; but he forms the same opinion of no other house, where his opinion has not been supported by experience, that is, he draws no general conclusion concerning the probability of similar good usage in similar houses. The pointer that has frequently been beaten for starting heath-game or partridge before the fowler was ready to take aim, learns in time to connect correction with such rashness, and consequently forbears the latter from fear of the former; but his associations extend not beyond his experience, and his primitive rashness remains with regard to a hare or a snipe.

I have now explained those classes of ideas which appear to be of consequence sufficient to attract attention; but, as I intend this course to be an introduction, not to the idle syllogism of the schools, but to sound reasoning in the sciences, in arts, and in business, and as ideas are the materials of all reasoning, before I relinquish this subject I shall point out the most frequent causes of their imperfections, and endeavor to suggest the best means of preventing or removing these imperfections. I shall not, however, treat of these topics separately, because they are necessarily conjoined. When we know the causes of errors, the road to truth is to avoid them. When the imperfections of ideas are removed, they become clear and distinct of course. I shall therefore comprehend both these views in the following *rules concerning the acquisition and examination of ideas.*

1. *Replenish the mind with as great variety of important ideas as possible.*

The end of all science, of reading, of observation, of

the study of nature and arts, of useful conversation, and of education, is to replenish the mind with ideas, in order to extend our knowledge, and to improve our faculties, to render us happy in ourselves, serviceable to society and our friends, and respectable in life. Human knowledge, it must be confessed, is in many articles extremely limited. The business, the avocations, even the necessary amusements and refreshments of life, employ a great part of our time. But, notwithstanding these disadvantages, much might be done, much important information might be obtained, were we to spend, in searching for new ideas, what portion of time may still remain unoccupied. Industry, properly directed, would be attended with signal acquisitions, and in this field nothing but industry can avail. Genius cannot begin to operate with advantage, till the mind has procured materials, numerous, valuable, and various. The end of education is to direct us in making these acquisitions; but it is not to be expected, considering the immensity of the field we traverse, at a time of life when our heads are giddy, and our faculties unaccustomed to investigation, that we should make very much progress in appropriating what we learn. The acquisition of new ideas should be the business of the best part of life, and no man ever accumulated a large treasure of them, who derived them not from his own application. Obtain, therefore, all the knowledge you can of science, of arts, of nature, of society, of manners, laws, and customs. Endeavor to gain great and comprehensive views of men and things in all your researches and inquiries, and let these views serve as foundations of your judgments and reasonings in all your particular pursuits.*

[* "The way of attaining such an extensive treasure of ideas" (says Dr. Watts), "is, with diligence to apply yourself to read the best books; con-

2. *Endeavor to attain accurate ideas of the information you receive, which requires two operations*, first, to compare ideas with their archetypes; second, to compare them with the established meaning of the words by which they are denoted.

I need not employ much time to evince the necessity and utility of this rule. Unless accuracy be obtained, all our labor and search are in a great measure thrown away. If the foundation be not properly prepared and secured, the superstructure can never be finished with beauty and strength. Inaccurate ideas are little better than no ideas; they are sometimes worse. In respect of every deduction resulting from them, they are not preferable to ignorance, because such deduction cannot be legitimate. But this is not their only inconvenience; they lead us to suppose ourselves well-informed when

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verse with the most knowing and the wisest of men; and endeavor to improve by every person in whose company you are: suffer no hour to pass away in a lazy idleness, in impertinent chattering, or useless trifles: visit other cities and countries when you have seen your own, under the care of one who can teach you to profit by travelling, and to make wise observations: indulge a just curiosity in seeing the wonders of art and nature: search into things yourselves, as well as learn them from others: be acquainted with men as well as books: learn all things as much as you can at first hand; and let as many of your ideas as possible be the representations of things, and not merely the representations of other men's ideas: thus your soul, like some noble building, shall be richly furnished with original paintings, and not with mere copies."

"In order to *preserve your treasure of ideas*, pursue the following advice:—

"(1.) Recollect every day the things you have seen, or heard, or read, which may have made any addition to your understanding: read the writings of God and men with diligence and perpetual reviews: be not fond of hastening to a new book, or a new chapter, till you have well fixed in your mind what was useful in the last.

"(2.) Talk over the things which you have seen, heard, or learned, with some proper acquaintance.

"(3.) Commit to writing some of the most considerable improvements which you daily make, at least such hints as may recall them to your mind, when perhaps they are vanished and lost."]

we are not so, and, of course, expose us to all the mortification which attends the detection of error, and to all those irksome contentions which arise from controversies about the meaning of words.

In comparing ideas with their archetypes, nothing more is requisite than patience and attention; for, by the exercise of these qualities, we shall render our ideas as adequate and accurate as it is in our power to make them. We should, for this purpose, carefully and repeatedly make comparison, particularly of ideas which lead to consequences of importance, or which relate to topics of ambiguity or difficulty.

Of the three kingdoms of nature—animals, vegetables, and inanimate matter, the objects generally remain as long as we please under our examination, and we have sufficient time to attend to every particular necessary to be known. In the demonstrative sciences, also, mathematics and arithmetic, our ideas of principles at least will be accurate; and it is seldom that our conceptions, even of proofs and conclusions, are liable to ambiguity. The precise and defined nature of the subjects of these sciences, the simple and perspicuous language in which most writers have agreed to communicate them, render it almost impossible for a reader endowed with ordinary attention not to comprehend distinctly the sense intended to be communicated.

It is, then, in the sciences susceptible only of probable proof, in morals, in politics, in metaphysics, in writings which convey miscellaneous truth, as history, criticism, but particularly in controversial writings, and in conversation, that the hazard of inaccurate ideas is very considerable, and the probability of avoiding them altogether is exceedingly small. One great source of ambiguity, in all these cases, is the indefinite nature of the subjects, and the different aspects under which they appear to different inquirers; but the greatest source is the unavoidable ambiguity of language, and the diffi

culty of ascertaining exactly the meaning of words.* This double indistinctness, both of the subjects and of the means of communication, cannot fail to produce important consequences in all our opinions and reasonings; and the subject is of too much moment not to obtain a little more of our attention.

[* Since reasoning, or inference, the principal subject of logic, is an operation which usually takes place by means of words, and in all complicated cases can take place in no other way, those who have not a thorough insight into the signification and purposes of words, will be under almost a necessity of reasoning or inferring incorrectly. And logicians have generally felt that unless in the very first stage they removed this fertile source of error, the pupil would not be in a condition to practise the remaining part of their discipline with any prospect of advantage. Therefore it is that an inquiry into language, so far as is needful to guard against the errors to which it gives rise, has at all times been deemed a necessary preliminary to the science of logic.

But there is another reason why the import of words should be the earliest subject of the logician's consideration; because without it he cannot examine into the import of propositions. Now this is a subject which stands on the very threshold of logic.—*Mill's Logic*, pp. 11, 12.]

LECTURE III.

IDEAS, SIMPLE AND COMPLEX—TO PREVENT AMBIGUITY—DIVISION—RULES—DESCRIPTION—DEFINITION.

To penetrate to the bottom of the doctrine of ambiguity, as it relates both to thoughts and language, and to provide every possible preservative against it, I begin with observing, that, in respect of simple ideas, all mankind are nearly agreed, both about the archetypes and the expression of them, as soon as they are acquainted with the objects that suggest them, and understand the language of which the expression makes a part. Simple ideas are not very numerous, and they are called simple, partly because they admit no divisions into parts, but chiefly because, in receiving them, the mind is perfectly passive, and cannot acquire them without an actual survey of the external objects which suggest them, or an actual feeling of the mental operations which produce them. The *chief simple ideas* are those of the qualities of external objects, shape, colors, tastes, smells, sounds; those of the operations of the mind, perception, judgment, reasoning, willing; and those of pleasure and pain, power, extension, unity, existence, which are derived partly from the senses, and partly from reflection.

There is no method of conveying any knowledge of these ideas but by presenting their archetypes to the external or internal percipients; and if a person be deprived of any of the senses which should convey the knowledge of them, no words, no signs, no known mode of communication can supply that defect; he must

forever remain in ignorance. If a person be deprived of sight, for example, he must be destitute of all conceptions of light and colors. If he require an account of thinking or willing, of pleasure or pain, we can only refer him to experience.

About these ideas, then, no controversy can exist; because, as all men must receive them from their archetypes, and, of course, all men must receive either the same impressions, and must have these impressions constantly suggested by the words allotted to denote them, or even if they receive somewhat different impressions, they must speak and reason about them as if they were the same—for every person can speak and reason only about the simple ideas in his own mind. For example, it is reasonable to believe that the idea of the color denoted by the word *green* is the same in the minds of all men; but though there were some difference of idea in different men, yet it could not perhaps be detected, for every person must speak and reason concerning that color from the idea of it he possesses.

The next class of ideas about which, and the words that denote them, little difference or ambiguity can take place, consists of those *complex ideas, which result from collections of simple ideas of the same kind.* These are the first remove from simple ideas; and as simple ideas are clear and intelligible, the compositions made out of them partake of the nature of their constituent parts, and are likewise clear and intelligible. The two sciences susceptible of demonstration present collections of such ideas, and on this account, among others, they are capable of that high species of evidence.

All the operations in arithmetic, however complex, never exhibit any collections of ideas, which result not from different combinations or fractions of the simple idea of unity. All the enunciations and demonstrations of mathematics, however compounded and refined, contain no ideas which are not formed from combinations of the simple idea of extension. All the triangles, circles, squares, and parallelograms, about which the mathematician is conversant, exhibit only different views and combinations of the same simple idea of quantity. About simple ideas, of course, and those sciences which involve combinations of them, men have differed very little,

either in the conceptions of them, or in the language that denotes them.

Thus far our path is luminous and patent; here, however, the field of perfect light terminates, and the *next step* lands us in some degree of darkness and obscurity. When we enter the confines of the other sciences, morals, politics, criticism; when we contemplate the subjects of miscellaneous knowledge, oratory, poetry, history, essays, or attend to the business of arts and common life, we immediately encounter complex ideas, comprehending large groups of subordinate ideas, and these groups composed not of combinations of the same simple idea, but of combinations of different ideas, partly simple and partly complex, and we find it almost impossible to avoid mistakes.

When we examine, for example, the ideas denoted by the word *beauty*, a word in everybody's mouth, when speaking of truth, arts, and animals, we are amazed at the multiplicity it includes, and the combinations it exhibits. When applied to truth, it denotes some important proposition, established by a clear but a refined train of proof—as when we speak of a beautiful theorem, or a beautiful discovery. When applied to animals, it includes the ideas of shape, color, utility, sensibility, acquired bodily and mental accomplishments, youth, health, gracefulness. When applied to arts, it includes uniformity, variety, high polish, convenience, utility—as when we speak of a beautiful woman, or a beautiful picture.

Taste is another word in frequent use among men of genius and lovers of the fine arts, and it also will serve to illustrate to what ambiguity communication is in many cases unavoidably exposed. It signifies that sensibility to the beauties of nature, genius, and art, which results from a sound state of the imagination and the understanding, and which leads us to distinguish and properly prize these beauties. It is plain that much ground of difference is laid in the nature of the objects of this internal sense, because every man must judge from the state of his own faculties, and the cultivation of the faculties of no two men, perhaps, is entirely equal. Their ideas of the objects of taste must share a similar difference, and must cor-

respond to the state of their respective faculties. It were easy to multiply examples; but it will appear from those I have adduced, that a double source of ambiguity prevails with respect to the ideas and words I have mentioned, and many more similar ideas and words, which every day occur in books and in business. The ideas which compose a complex idea may really be different in different men's minds, according to the improvement of their faculties or powers of perception; but the greatest hazard of error results from the inattention with which the complex idea may be formed. Thus, one man may omit some of the ideas which compose the complex ones of beauty and taste; others may add to them more ideas than they naturally and justly contain.

Another great source of ambiguity in every inquiry where body or spirit is concerned, is the *nature of substances*, whether corporeal or spiritual. What substance is, we are utterly ignorant. All we can conceive of it is, that it supports qualities; and, of course, all our ideas of substances are nothing more than collections of the qualities we have found to belong to them respectively. Now, if any person form not the same conception with us of any of these qualities, or if he either add to or diminish their number, it is plain that his complex idea of the substance can never agree with ours, and that in all communication concerning it, we and he must misunderstand one another.

From these observations, the following important *practical rules* will be allowed to result, as the best preservatives *against ambiguity*.

1. In all cases *when complex ideas come under our consideration, we should employ every precaution to render our collection of the constituent ideas as complete and accurate as possible;* and whenever we discover that our reasonings and conclusions disagree with the reasonings and conclusions of those with whom we converse, or whose books we read, we should stop and re-examine both the constituent ideas and the expres-

sion of them, because it is a thousand to one tha in the re-examination we shall discover the cause of the difference.

The propriety and utility of every part of this rule appears so obvious as hardly to need any illustration. Happy had it been for the peace of society, fortunate had it been for the progress of knowledge, if it had always been punctually practised. All those irritating and frivolous disputes which pester conversation, almost all those controversies which have disturbed and distracted the world, would have been prevented. Consult the controversies which have involved, not individuals only, but classes and periods of learned men, and you will find that they have originated chiefly from misapprehensions of the ideas and terms which furnish the ground of the difference, and that, if the parties had exercised any patience and pains to understand one another, before they began to dispute, they might have prevented much trouble and vexation to themselves, and much contention and disturbance to society.

The famous controversy concerning the superior merit of ancient or modern learning, which interested and divided almost all the learned men of Europe in the end of the seventeenth and the beginning of the eighteenth century, and which still interests, and sometimes divides, learned men, appears a pertinent illustration. It is a controversy about the meaning of words, and affords very little ground of difference of opinion when the terms are fully ascertained. The parties have never considered, that no comparison of authors can exist, except in circumstances perfectly similar. If the state of ancient society gave encouragement to some efforts of genius and industry, which are not now prompted by similar incitements, can we wonder that these efforts should be more brilliant in the former situation, than they are found to be in the latter? If oratory, statuary, architecture, and perhaps poetry, received superior countenance and patronage in Greece, than they found even in Rome, and much more than they have found in modern times, is

it not natural to expect that their exhibitions should be more deserving of applause?

If, on the other hand, the moderns possess superior knowledge of the system of nature, from the advantages which the progress of science has thrown into their hands; if the improvements of government, and the extension of refinement and knowledge, have led them to excel in politics, in moral researches, and in the greater part of the useful arts, can we be surprised at their superiority? It was impossible that the moderns could rival the ancients in the former case; it is equally impossible that they should equal us in the latter. The superiority in the one case, or the inferiority in the other, is no compliment to, or impeachment of, the genius of either; it is the natural consequence of the different situations of human affairs, and could not, without a miracle, have been otherwise. Had the keen combatants in this controversy attended to this natural state of the case, they would have forborne their ill-founded and injurious recriminations. The patrons of modern literary merit unjustly measure the merits of ancient genius by a scale adopted from modern ideas and manners; the patrons of ancient genius retaliate the same game, and pretend to determine the eminence of modern genius by a scale derived from the ideas and manners of ancient times. Let these reasonable limitations be admitted, and the shadow of a controversy, I believe, would vanish; the difference would at least be found to be so frivolous, as to satisfy everybody of the absurdity of the contest.

2. *After ascertaining the amount of a complex term by enumeration, by description, or by definition, employ it always in the same sense, without adding to, diminishing, or changing the ideas it denotes.*

Enumeration, commonly called division by logicians, is *a recapitulation of the subordinate ideas of which a complex idea consists*, and forms a very satisfactory method of explaining or ascertaining that complex idea.

For example, the term *gratitude* includes the following subordinate ideas: a consciousness of favor received, a disposition to acknowledge it on every proper occasion, and a resolution to seize the first opportunity of returning a similar favor to the benefactor.

Honor, in like manner, includes an unalterable regard to truth in words, humanity and generosity in actions, candor and forgiveness in thoughts, and resentment of insult or affront.

[*Division* of a conception enumerates all the objects or classes that are included under it, and so deals with the extent of the notion; or it is the *enumeration* of the various co-ordinate species of which a proximate genus is composed. The *rules for conducting the process* correctly are—

(1.) The constituent species, called the dividing members, must exclude one another.

(2.) The constituent species must be equal, together, to the genus divided.

(3.) The division must be made according to one principle or ground.

The first rule is to secure that the classes and sub-classes shall be distinct from each other. Exceptions to this rule are often unavoidable, especially in subjects that do not belong to strict science: thus, in enumerating the species of imaginative writers, one would probably mention poets, dramatists, and writers of tales; yet some poets are dramatists, and some tales are poems.

The second rule provides that no class shall be omitted, and secures completeness.

The principle of division mentioned in the third rule, is some new conception, for the marks of which we seek in the conception to be divided. Thus *man* may be divided into European, African, Asiatic, American, and Australian; and again into Christian, Moham medan, Jew, and Pagan; and again into just and unjust. The separation of the parts of any individual object, as of a sword into blade and hilt, is termed *partition*. An individual is that which cannot be divided without ceasing to be what it is: its parts cannot have the name of the whole. When a genus is divided, every part of it remains unchanged, and may have the name of the genus. The trunk and limbs of a man cannot be severally called a man; but a European is a man, and an Asiatic, and an American.—*Thomson.*]

Description, also, is a sort of enumeration, but is applicable chiefly to objects of sight. It is used often to distinguish objects of sight, which have not obtained names, or of which the names are unknown. We describe a landscape, a river, a house, a town, a ship, a

horse, a tree, a robber, in order to communicate ideas of these objects to those who have not seen them, or to enable those to distinguish them when they do see them. *Description is a recapitulation of the parts or properties of the object described.*

A landscape, for instance, contains corn-fields, plantations, water running or stagnating, hills, houses, villages, animals, situate in such a manner as diversify it from all other landscapes. The color, shape, strength, gentleness, fleetness, and easy motion, which constitute the description of my horse, discriminate him from all other horses. A deserter, or a robber, is described by his stature, figure, complexion, features, and dress; or, in other words, by a recital of the particulars which form his appearance, and which mark him out among other men.

Definition is the last method of ascertaining complex ideas or general terms, and differs not essentially from the preceding methods. The chief difference is the use of it on different occasions. It may be employed in fixing complex ideas of all sorts, whether their archetypes are objects of the external senses, or are the creatures of reflection, that is, whether they exist in matter or in mind. It is used, however, chiefly to ascertain species, whose archetypes exist in the mind. *A good definition consists of two parts;* by one part are marked those objects with which the thing defined has any common qualities; by the other part are marked those qualities which characterize the thing defined alone. Nothing more can be done to ascertain the nature of any object, than to point out those objects with which it has any common qualities, and next to enumerate the qualities peculiar to itself. Hence the logical rule, that *every definition* should consist of a genus and a specific dif-*

* As division ascertains the various classes of objects united under one conception, so does definition ascertain those common marks which all the objects possess, or that common nature represented by the conception

ference, the genus denoting the common qualities, and the specific difference the characteristic or peculiar ones.

Suppose, for example, it were required to define what the mathematicians call a square, or a parallelogram, these most accurate of all logicians will tell us, that "a square is a figure which has four equal sides, and four right angles," and that "a parallelogram is a figure that has four angles, and four sides, the opposite angles and sides only being equal."

The things defined are *species*, that is, the square and the parallelogram are not a square and parallelogram which exist in some book, or are delineated on a particular board; they stand for the entire species of squares and parallelograms, and mark the properties common to all the individuals of these species. The first part of the

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The *rules of definition* may be stated, as a help to understanding the process itself.

(1.) *A definition must recount the essential attributes of the thing defined.* Thus, in defining "words" as "the articulate signs of thoughts," we are not to introduce such a superfluous mark as "words are the articulate signs *by which an orator* expresses his thoughts;" for whilst this is true, it is not necessarily found in the conception in our mind, and consequently has no place in the act of analyzing it.

(2.) *The definition must not contain the name of the thing defined;* as this is precisely the word we are bound to explain. Thus, if "life" is defined to be "the sum of the vital functions," we have not logically defined "life," as the word "vital," which implies it, stands unexplained in the definition.

(3.) A definition must be precisely adequate to the species defined. If it explain a species below, it is said to be too narrow, as where "triangle" is defined "a rectilinear figure with three *equal* sides and angles." If it is applicable to the genus above, it is too wide, as when we define "words" as the "sign of thoughts," whereas there are other signs also.

(4.) A definition must not be expressed in obscure, or figurative, or ambiguous language. The Divine Nature has been represented as "a circle whose centre is everywhere, and whose circumference is nowhere;" but this bold figure cannot for a moment be accounted a definition.

(5.) A definition must not be negative. "Evil is that which is not good." "A point is that which has no parts and no magnitude." These definitions are to be judged according to our view of the possibility of finding others of the positive form. Some conceptions are in their nature negative, as indivisibility, blindness, and must be defined negatively.—*Thomson.*]

definition refers them to their *genus*, or characterizes them by the name of *figures*, by which it is signified that they have something in common with all other mathematical species, circles, triangles, rhombuses, ellipses, namely, they include space, and are bounded by lines. The second part of the definition exhibits their *specific difference*, or enumerates the *peculiar properties* which distinguish them from all the other species of the same genus; squares have four right angles, and four equal sides; parallelograms have also four angles and four sides, the opposite angles and sides only being equal, which no other species have but themselves.

If I define eloquence to be the art of speaking or writing well, logic the art of reasoning well, statuary the art of forming an exact resemblance of the human shape in marble, painting the art of delineating a resemblance of the same shape on canvas by means of oil colors, I refer all these species to their genus, and mark properties in which they all agree, namely, in being arts, or something acquired by industry and practice, and then I mention the properties which distinguish these arts from all other arts, and from one another; eloquence by speaking or writing well, logic by reasoning well, statuary by forming a resemblance of the human shape in marble, painting by delineating a similar resemblance on canvas.

If, again, I define morality to be the science which teaches to be wise, virtuous, and happy; politics the science which teaches to provide for the prosperity of communities, or large bodies of men; mathematics the science which teaches to compute quantity; pneumatics the science which teaches the properties of spirits, or the doctrine of fluids; optics the science which teaches the theory of vision and colors: I refer, first, all these branches of knowledge to their next genus, science, by which I signify, that they all agree in presenting some useful truths to the mind, and that they are supported by satisfactory evidence. In the second place, I distinguish each science from the rest, and from all other sciences not mentioned, by specifying as above the particular truths which it inculcates.

Definition might certainly be employed to discriminate complex ideas on every occasion, and might supersede both enumeration and description; but in all such cases, the specific difference would become either an enumeration or a description. Indeed, there is no material difference between these methods of ascertaining

ideas, except in the length of the specific difference. An enumeration, or a description, either includes or supposes a genus, to which the idea explained refers; and the *specific difference of every definition is either an enumeration or a description.*

For example, the enumeration formerly advanced, of the ideas expressed by the word *honor*, may easily be converted into a definition, of which the specific difference will become the enumeration itself. "Honor is a disposition which prompts us to regard truth in our words, generosity in our actions, candor in our thoughts, and to entertain resentment of insult or affront." In like manner, I may convert the description of a horse into a definition, of which the description will constitute the specific difference. I may call him an animal of a cylindrical body, long and taper legs, high neck, beautiful head, of a bay color, gentle temper, easy motion, and fit for riding. It is to be observed, however, when the specific difference resolves itself into an enumeration, or a description, it is of little consequence to distinguish the genus. On the other hand, when it is of consequence to distinguish the genus, the specific difference seldom consists of more than one or two properties. Definition is always used in the last case, and enumeration or description in the two first. Enumeration is commonly employed to explain complex ideas, of which it is of little consequence to mention the genus; description, to ascertain complex ideas, the archetypes of which are objects of sight; and definition, to ascertain the abstract ideas of species.

With respect to definition, it is proper further to observe, that *we must never attempt to apply it to simple ideas*, because they are immediately derived from perception, prompted by the objects or operations which suggest them; and no definition or explication can render them more distinct or intelligible than they are. Even the mathematicians have not always been sufficiently attentive to this remark.

The word *ratio* denotes the idea of equality or inequality, which results from the comparison of two magnitudes of the same kind in point of quantity; as when one of the magnitudes is said to be

equal to, greater or less than the other, or to hold to it some fixed proportion. The idea appears to be simple, at least no words can make it plainer than the actual comparison of the magnitudes by which it is prompted. Yet all the editions of Euclid I have seen, previous to the one published by Dr. Simpson of Glasgow, present definitions of it. "Ratio," we are told, "is a habitude of magnitudes of the same kind, according to quantity." Habitude is a word at least as unintelligible as ratio; yet it seems no plainer word could be found. The truth is, the definition should not have been attempted, and Simpson has accordingly expunged it.

Motion is another simple idea, on which Aristotle, and the schoolmen after him, have exercised their ingenuity, and have produced the following famous specimen of jargon. They tell us, that motion is "actus entis in potentia, quatenus in potentia," the act of a being in energy, as far as it is in energy. Even later and better philosophers, who define motion by "a passage from one place to another," do not make the matter much plainer. They only substitute one word for another, and it is difficult to decide whether motion is better explained by passage, or passage by motion.

As, then, complex ideas only are susceptible of explication in any of the ways I have mentioned, if we would preserve perspicuity, careful attention must be paid that the same meaning, thus settled, shall be invariably retained. The determination of this point is simple and easy, and may always be accomplished by *substituting the explication in the place of the term defined.* If this be practicable, and the sense be preserved, we may be confident we have not changed the meaning of the term.

Before I relinquish this branch of the subject I must observe, that although, in compliance with the example of all logical writers, I have hitherto considered, and shall through the whole of this course continue to consider, all knowledge as composed of ideas, and shall call every impression made on the mind, whether derived from an external or an internal archetype, by this name; yet that some late writers of eminence have

called these impressions by other names than that of ideas. All impressions, then, prompted by archetypes, which have a real existence without the mind, they distinguish by the name of *perceptions*. All impressions, of which the archetypes have no real existence, but are the creatures of the imagination, as a mountain of gold, a sea of milk, they denominate *conceptions*. Those impressions only they call ideas, which have been formerly received into the mind, and are again recalled by memory. You will find this explanation useful in reading some metaphysical, and even some critical writers; but it is more convenient for our purpose to give the name of *idea* to every impression, whether simple or complex, and from whatever source it may be derived.

[*Definitions* have been *divided into those of names and those of things:* the former explain the meaning of a term, the latter the nature of a thing, the last being the most important.

The distinction between nominal and real definitions, between definitions of words and what are called definitions of things, though conformable to the ideas of most of the Aristotelian logicians, cannot be maintained. We apprehend that no definition is ever intended to "explain and unfold the nature of the thing." No definition can unfold its whole nature; and every proposition in which any quality whatever is predicated of the thing, unfolds some part of its nature.

The true state of the case we take to be this. All definitions are of names and of names only: but in some definitions it is clearly apparent, that nothing is intended except to explain the meaning of the word; while in others, besides explaining the meaning of the word, it is intended to be implied that there exists a thing corresponding to the word. Whether this be or be not implied in any given case, cannot be collected from the mere form of the expression. "A centaur is an animal, with the upper parts of a man and the lower parts of a horse," and "A triangle is a rectilineal figure with three sides," are, in form, expressions precisely similar; although in the former it is not implied that any *thing*, conformable to the term, really exists, while in the latter it is, as may be

seen by substituting in both definitions the word *means* for *is*. In the first expression, "A centaur means an animal, &c.," the sense would remain unchanged: in the second, "A triangle means, &c.," the meaning would be altered, since it would be obviously impossible to deduce any of the truths of geometry from a proposition expressive only of the manner in which we intend to employ a particular sign.

There are, therefore, expressions, commonly passing for definitions, which include in themselves more than the mere explanation of the meaning of a term. But it is not correct to call an expression of this sort a peculiar kind of definition. Its difference from the other kind consists in this—that it is not a definition, but a definition and something more. The definition above given of a triangle, obviously comprises not one but two propositions, perfectly distinguishable. The one is, "There may exist a figure, bounded by three straight lines:" the other, "And this figure may be termed a triangle." The former of these propositions is not a definition at all: the latter is a mere nominal definition, or explanation of the use and application of a term. The first is susceptible of truth or falsehood, and may therefore be made the foundation of a train of reasoning. The latter can neither be true nor false: the only character it is susceptible of, is that of conformity or disconformity to the ordinary usage of language.

There is a real distinction, then, between definitions of names and what are erroneously called definitions of things; but it is, that the latter, along with the meaning of a name, covertly asserts a matter of fact. This covert assertion is not a definition, but a postulate. The definition is a mere identical proposition, which gives information only about the use of language, and from which no conclusions affecting matters of fact can possibly be drawn. The accompanying postulate, on the other hand, affirms a fact, which may lead to consequences of every degree of importance. It affirms the real existence of things possessing the combination of attributes set forth in the definition; and this, if true, may be a foundation sufficient on which to build a whole fabric of scientific truth.—*Mill's Logic*, pp. 98, 99.]

LECTURE IV.

KNOWLEDGE AND TRUTH, WHAT?—THE RESULT OF INTUITION OR OF REASONING—DIFFERENT KINDS OF PROPOSITIONS—SOURCES WHENCE DERIVED.

In former lectures I have considered ideas as simple, as complex, distinct or confused, adequate or inadequate, particular or abstract; and I have illustrated at considerable length the pains we must take, and the rules we must follow, in order to have them in the most perfect state, and to obtain over them the most complete command. All, however, I have hitherto advanced, is a mere preparation of the materials of logic; we have not yet taken the least step towards applying them to any use in the investigation of truth and knowledge. To this application I am now to proceed.

The investigation of truth and knowledge consists of two operations. The first compares two ideas, in order to perceive in them agreement or disagreement; the second compares two ideas, by the help of one or more intermediate ideas. The truth or knowledge acquired by the first operation is said to result from *judgment;** the truth or knowledge acquired by the second operation is said to result from *reasoning.* I begin with

[* It is hardly necessary to remark, that judgment enters as an element into almost all our mental acts. We think in judgments; that is, we are always affirming one thing of another, and we do not consider any thing else to be thinking. To conceive of things without forming judgments, is to make no progress. We can only be said to think when we form a judgment respecting two conceptions, in which one is affirmed of the other.—*Dr. Wayland.*]

judgment, and the truth and knowledge which are attainable by its means.

Two preliminary questions occur: what is knowledge? and, what is truth? We are familiarized with these words, and we are not disposed to suspect there is any mystery in their meaning. But it is not, perhaps, so obvious as is generally supposed; and it is of so much importance in our present inquiries, that we must not proceed without attempting to ascertain it. *Knowledge*, then, I assert, is the perception of the agreement of ideas with one another; *truth*, is the agreement of ideas with words. But what, it will again be asked, perhaps, is the signification of these words, *agreement* and *disagreement?* I reply, that the signification of these words is not always the same, but varies according to the nature of the science, art, or subject, about which the ideas are conversant. A few examples will be the best illustration.

In arithmetic and mathematics, the only comparison of ideas which can take place relates to the equality or inequality of the quantities; agreement denotes equality—disagreement, inequality. When I compare the quantities four and five, I perceive that they are unequal, or that the ideas of them disagree. I perceive further, if I add one to four, that these two together will form a compound quantity, which will be exactly equal to five, or that the ideas four and one conjoined will agree with the idea five. My knowledge, then, that four is not equal to five, but that four and one are equal to five, is the intuitive perception I have that the idea of four disagrees with the idea of five, while the idea of four and one together agrees with the idea of five.

In like manner, from the ideas I have of a right angle, or half a right angle, or from the ideas I have of an acre, and half an acre, I know certainly that the half right angle disagrees with, or is a less quantity than the whole right angle—that the half acre disagrees with, or is a less quantity than the whole acre; and that if I double the half right angle and the half acre, I shall form two compound quantities, the ideas of which will agree respectively with those of

the whole right angle and the whole acre. The perception of the agreement or disagreement of ideas, in all these cases, is the same thing with the knowledge of the equality or inequality of the quantities compared.

If, in natural philosophy, I compare body or matter with divisibility, I immediately discover that divisibility applies to, or is a property of, matter; in other words, I find that the ideas of matter and divisibility agree together, and I know that matter is divisible. Agreement, in this case, signifies property or relation, not equality, as in the preceding cases. If I maintain, in morals, that a good man is happy; or in politics, that a wise king is a blessing to his people; or in arts, that industry is commonly attended with success, my knowledge of all these maxims is perfectly the same thing with the agreement I perceive between the ideas of a good man and happiness, of a wise king and the happiness of his people, of industry and the acquisition of wealth.

Truth relates to the enunciation of knowledge, and *is the agreement of ideas with words.* If I assert that the British is a free government, and that the English are more industrious than any other nation in Europe, I maintain truth, because my words actually correspond to accurate ideas of the facts. If, again, I say that the three angles of a triangle are equal to two right angles, I express a truth, because it is demonstrable that my words and ideas agree. Falsehood, on the other hand, is the disagreement of words with ideas [i. e., with accurate ideas of the facts of the case]; as when it is asserted that the British government is despotic, or that the three angles of a triangle are equal to three right angles. A mistake, is the actual disagreement of words with ideas, when we suppose that they agree. The ignominious falsehood called a lie, is the disagreement of words with ideas, uttered with an intention to deceive.

Knowledge, further, is of *two kinds*, *certain and probable.* Certain knowledge takes place when the mind is perfectly satisfied of the agreement or disagreement of

its ideas.* Probable knowledge takes place when the agreement or disagreement of ideas is not so clear as to afford perfect satisfaction, and the degrees of probability are greater or less, according as the satisfaction is more or less perfect.

In judging of the agreement or disagreement of ideas, we must examine them in pairs, and the words in which we express that judgment form a sentence, called a *proposition*. For example, if the idea of a whole be compared with the idea of a part, it is immediately found that they disagree; and this judgment is expressed by the following proposition: "The whole is greater than any of its parts." But, if the idea of the whole be compared with the idea of all its parts taken together, it is found that they agree; and this judgment is expressed by the following proposition: "The whole is equal to all its parts taken together."

If the agreement or disagreement be perceived by bare juxtaposition of the ideas, without the intervention of any intermediate idea, the evidence of the proposition is said to be intuitive. But, if the agreement or disagreement be perceived by means of some intermediate idea, or train of ideas, the mind then must proceed by steps. It must compare the first idea of the proposition with the first intermediate idea, and pass a judgment on their agreement or disagreement. It must next compare the first intermediate idea with the second inter-

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[* Knowledge is a clear and certain conception of that which is true, and implies three things: firm belief—of what is true—on sufficient grounds.

Our knowledge is of two kinds: of facts, and of truths. A fact is any thing that *has been*, or *is*. We derive our knowledge of facts through the medium of the senses.

Truth is an exact accordance with what *has been*, *is*, or *shall be*. There are two methods of ascertaining truth: (1) by comparing known facts with each other; (2) by comparing known truths with each other. Hence, truths are inferences, either from facts or other truths.—*Davies' Logic of Mathematics.*]

mediate idea, and pass a similar judgment. It must proceed, in like manner, through all the intermediate ideas, and pass similar judgments, till it comes to compare the last intermediate idea with the latter idea of the proposition; and from all these intermediate judgments the conclusive judgment is deduced, concerning the agreement or disagreement of the two primary ideas of the proposition. In this case the evidence of the proposition, declarative of the agreement or disagreement of the two primary ideas, is said to be founded on reasoning.

Hence it appears that all knowledge, whether it be the offspring of intuition or the result of reasoning, is denoted by propositions, which express the agreement or disagreement of ideas; that each proposition contains two ideas, simple or complex, besides the assertion of agreement or disagreement; and that the proposition which denotes agreement may be called affirmative, that which denotes disagreement may be called negative. "That the three angles of a triangle are equal to two right angles," is an affirmative proposition; "that a part is not equal to the whole," is a negative one.

The two capital ideas constitute two parts of a proposition. The first idea, or sometimes several ideas considered as one, is that of which something is affirmed or denied, and is therefore called the *subject* of the proposition; the second idea, or sometimes several ideas considered as one, is the property, or quality, or attribute, which is either affirmed or denied to belong to, or to agree with, the first idea, and is therefore called the *predicate* of the proposition. "The three angles of a triangle are equal to two right angles," is a proposition, of which the idea of the three angles forms the subject, and the idea of equality to two right angles forms the predicate. The affirmation contained in the

word *are* is commonly called by logicians the *copula* or *connective* of the proposition.*

[Mr. Thomson more briefly thus defines these several parts of a proposition or judgment:

Every judgment has three parts: the subject, or notion about which the judgment is; the predicate, or notion with which the subject is compared; and the copula, or nexus, which expresses the mode of connection between them. The subject and predicate are called the terms of the judgment, i. e., the extremes or boundaries (*termini*) which it brings together.]

[The subject (Dr. Wayland remarks) may be either an individual or a species,—the predicate must be a genus; that is, it must designate a larger class than the subject. In a proposition, we therefore affirm that a particular individual is included within a particular

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[* The *copula* is the sign denoting that there is an affirmation or denial, and thereby enabling the hearer or reader to distinguish a proposition from any other kind of discourse. Thus, in the proposition, "The earth is round," the predicate is the word *round*, which denotes the quality affirmed, or (as the phrase is) predicated; *the earth*, words denoting the object which that quality is affirmed of, compose the subject; the word *is*, which serves as the connecting mark between the subject and predicate, to show that one of them is affirmed of the other, is called the copula.

A predication is sometimes distinguished from every other kind of discourse, by a slight alteration in one of the words, called an *inflection;* as when we say, Fire burns; the change of the second word from *burn* to *burns*, showing that we mean to affirm the predicate *burn* of the subject *fire*. But this function is more commonly fulfilled by the word *is*, when an affirmation is intended; *is not*, when a negative; or by some other part of the verb *to be*.

It is apt to be supposed that the copula is much more than a mere sign of predication; that it also signifies existence. In the proposition, "Socrates is just," it may seem to be implied that not only the quality *just* can be affirmed of Socrates, but moreover that Socrates *is*, that is to say, exists. This, however, only shows that there is an ambiguity in the word *is;* a word which not only performs the function of the copula in affirmations, but has also a meaning of its own, in virtue of which it may itself be made the predicate of a proposition. That the employment of it as a copula does not necessarily include the affirmation of existence, appears from such a proposition as this, "A centaur is a fiction of the poets;" where it cannot possibly be implied that a centaur exists, since the proposition itself expressly asserts that the thing has no real existence.—*Mill's Logic*, pp. 12, 53.]

class. Hence every proposition must be either true or false. The subject is either included within the class designated by the predicate, or it is not. It cannot be neither within nor without it.]

[Judgments (or propositions), according to the common account of relation, are divided into three classes: the *categorical*, the *hypothetical*, and the *disjunctive*.

The categorical judgment is one in which one conception is affirmed to belong or not to belong to another, as, "Men are endowed with conscience;" "An enslaved people cannot be happy."

The hypothetical expresses seemingly a relation between two judgments, as cause and effect, as condition and conditioned; for example, "If the autumn is very dry, the turnip crop is scanty;" "If the heart is right, so will the actions be."

The disjunctive judgment expresses the relation (apparently) of two or more judgments which cannot be true together, and one or other of which must be true; as, "Either the Bible is false, or holiness ought to be followed;" or the proverb, "A man is either a fool or a physician at forty."—*Thomson.*]

Propositions, further, are distinguished by different names, according to the clearness of the evidence by which the agreement or disagreement of the subject and predicate is evinced. If the evidence be perfectly satisfactory, the proposition is denominated *certain.* If the evidence be not perfectly satisfactory, it is denominated *probable;* and it is more or less probable, according as the evidence is more or less satisfactory. If the evidence for the agreement of the subject and predicate balance the evidence for their disagreement, the proposition is called *doubtful.* If the evidence be stronger on the side of disagreement, it gets the name of *improbable;* and the improbability will be the greater, as

the evidence of disagreement shall increase. If the proposition bear an affirmation contrary to [accurate] ideas, it obtains the name of *false*. If the affirmation be conformable to [such] ideas, it is denominated *true*.

Propositions, also, are divided into *universal*, *particular*, *singular*, *and indefinite*. A proposition is *universal*, when the subject of it comprehends an entire genus or species. Thus, "All animals are endowed with life and organization," is a universal proposition, because the subject of it includes, and the predicate applies to, all living creatures, or to a whole genus. "All men are liable to err," is another universal proposition, because the subject includes, and the predicate applies to, a whole species, or every individual of the human race. A *particular proposition* denotes a limited or partial meaning of the subject, or signifies that it does not include an entire genus or species; and, in this case, the restricting words, *some*, *few*, *many*, &c., usually precede the subject of the proposition. For example: "Few men spend all their time to the best advantage;" "Many men repent of their folly when it is too late;" are both particular propositions, because they include a part only of the human species to which they refer.

A *singular proposition* has an individual for its subject; as when we say, "Alexander conquered Persia;" "Cæsar was assassinated in the senate-house." An *indefinite proposition* relates to one individual among many, and is commonly introduced by the indefinite article: "A wise man guides his affairs with discretion;" "A fool is perpetually betraying his ignorance and impudence." Propositions likewise are denominated *conditional*, when they express condition or dependence, "If people break the laws, they will be punished;" or *relative*, if they denote consequence or con-

nection, "Though he fall, yet will he rise again." But distinctions of this kind seem to belong more to gram mar than to logic.

[*Propositions* are nothing more than *expressions of relations* of one kind or another which we have previously recognized: there are the relations *of position*, *resemblance or difference*, *proportion*, *degree*, and *comprehension*.

I judge that A is actually higher than B, though at first sight it might appear to be lower; i. e., I recognize the relation of position which they bear to each other. I judge that this picture resembles my friend, in certain respects, and that it is entirely unlike him in others: i. e., I am impressed with the relations of resemblance and dissimilarity, which exist between the picture and my friend. I judge that two is to four, as this latter number is to eight; i. e., I feel the relation of proportion which the numbers bear to one another. I judge that a house consists of its foundation, roof, different apartments, &c.; i. e., I feel the relation of these parts to one comprehensive whole. A mental judgment is a mere feeling or notion of relation; and when utterance is given to it by words, it becomes a proposition. Two are the half of four. The words embody a recognized relation between two and four.

The relation of comprehension is that, the recognition of which is usually, at least, involved in what we call an act of reasoning. Dr. Brown thinks that all these various relations may be resolved into the single relation of comprehension, or the relation of a whole to the separate parts included under it. It is not necessary, however, to push our analysis so far. A whole may be regarded by us as made up *of parts*, which admit of actual separation from each other—as in the case of a book, and its covers and leaves; or of *qualities* which have no independent existence—as when we say of gold, it is ductile, yellow, &c. "A flake of snow," says Dr. Brown, "is composed of particles of snow which exist separately; and this composition of separate particles in seeming coherence, is one species of totality. But the same snow, without any integral division, may be considered by us as possessing various qualities, which qualities are part of our complex notion of snow, as a substance." It is the faculty of recognizing relations which enables us to feel that the flake comprehends the particles of which it is composed, and that our general notion of snow comprehends a notion of the various properties which it possesses.

An affirmative proposition of this kind is, then, built upon a previously-felt relation of comprehension; since it enumerates or predicates some quality or attribute of a subject, which may be said to form a part of the subject itself, and the notion of which is a constituent of our complex conception of the subject. The one quality of which we speak is comprehended, and felt to be so, with other qualities, in that general aggregate to which our state is to belong. "Gold is ductile;" i. e., our complex conception of gold comprehends the particular notion of ductility. Every affirmative proposition, then, of this kind, involves a mental analysis of a complex notion. Our notion of snow is complex; i. e., it is as if it were made up of the conceptions of the individual qualities which it possesses. We cannot, accordingly, affirm snow to be white, till, by a process of mental analysis, we have ascertained that whiteness is a constituent part of our conception of snow; though the proposition itself reunites this elementary part to the complex notion again.—*Payne's El. Mental Science.*

The application of these remarks to the subject of Reasoning, will be found in a note at the end of Lect. viii.]

Propositions sometimes receive different names, according to the kinds of evidence by which they are supported. The chief of these kinds are, *sensation*, *consciousness*, *intuition*, *reasoning*, and *testimony*. It is of consequence to consider propositions with regard to these kinds of evidence, because they lead us to the capital sources of human knowledge.

Thousands of *propositions*, and much useful knowledge, are *derived from the external senses and feelings.* By these we are made acquainted with all the objects in nature, which can contribute either to use or to pleasure; and of all the propositions derived from the testimony of these senses and feelings, we never, in the intercourse of life, presume to entertain the slightest doubt. We believe that the city, the house, the man, the horse, the tree, the fish we behold, really exist, and possess those properties or qualities which we perceive to belong to them. We never hesitate whether the

propositions containing the result of our perceptions respecting them are true. We hesitate as little about propositions significant of the reality of our bodily feelings, and of our desires to gratify them; such as, that hunger, thirst, pain, are uneasy sensations, from which all men wish to be relieved, and that rest after fatigue is a source of pleasure. In all these cases, no means of conviction are presented to the mind, besides perceptions and feelings. The knowledge, accordingly, derived from this source, is often called the dictates of sense; and the sentences that denote it are sometimes termed sensible propositions.

I have observed, that no man, in mixing with the world, or when engaged in business, can permit himself one moment to discredit the evidence of his senses, or to disbelieve the information he receives through that channel. Some philosophers, however, in speculation, have ventured to question the credibility of this evidence, and have not scrupled to conclude, that from any thing we know, all the splendid exhibitions of nature and art, with which the world abounds, may be no more than phantoms of the imagination, a magnificent display of ideal scenery without reality. They have applied a similar theory to the evidence of internal sensation or consciousness, and, finding it equally unworthy of credit, they have ventured to annihilate the immaterial world also; and thus, banishing both matter and spirit from the universe, they have left in nature nothing of real existence but ideas and imaginary powers to prompt these ideas. A philosophy so bold and tremendous in its consequences, cannot fail to excite a little our curiosity; and as it has subsisted long in the world, and has attracted a good deal of attention, some account of it may be expected.*

[* The account, given by the author, of the speculations of Aristotle, Epicurus, Locke, Hume, and others, is here omitted, as belonging more appropriately to a general work on mental science.—*Ed.*]

LECTURE V.

PROPOSITIONS DERIVED FROM CONSCIOUSNESS, INTUITION, REASONING, TESTIMONY—INFERENCE OR REASONING IN GENERAL —PREJUDICES.

Consciousness is a copious source of knowledge, and *furnishes evidence of the truth of a numerous class of propositions.* By it we gain an acquaintance with the human constitution, particularly with the important operations of the understanding, the imagination, and the passions. If I affirm that the imagination is pleased with a fine prospect, a beautiful landscape, an elegant exhibition of art, whether in writing, painting, statuary, or architecture; if I assert that the understanding is delighted with the discovery of truth on all subjects, and in all degrees, from the lowest stage of probability to the most triumphant evidence of intuition or demonstration; if I maintain that all our passions were given us for wise and good purposes; that all the gratifications of them, within the limits prescribed by reason and virtue, are pleasant, salutary, and commendable; and that all irregular gratifications are not only improper in themselves, but are also painful and destructive; I have hardly any proof to produce of the numerous propositions, which express the various cases into which these views of the human mind may be resolved, except an appeal to the consciousness of the person I wish to convince.

If he shall deny that his imagination is captivated with a beautiful scene of nature or art; if he shall declare that his understanding receives no pleasure in the discovery of truth; or that the gratification of a regular passion yields him no joy, while the agi

tation of an irregular one fills him with satisfaction; all I can urge is, that he mistakes his constitution, or that the structure of it is different from that of most other men. But if he persists in maintaining the consciousness of the truth of what he asserts, I can only oppose a contrary consciousness on my part. We must continue of different opinions, for I can produce no arguments to persuade him to adopt my sentiments.

From this view of knowledge it will appear, that many moral and political propositions, many which communicate truth in oratory, poetry, criticism, and business, are principally, if not entirely, supported by consciousness.

If I assert that all men applaud a generous or a grateful action, and detest an unjust or a cruel one; that kings are prone to tyrannize over their subjects, or that the people are disposed to insult and oppose their rulers; that the beauties of eloquence and poetry are felt by all mankind, even the most unpolished and unlearned; that the rules of criticism are nothing more than the theories of emotions and passions; that prudence and industry are the best and surest means of attaining success in business, while folly and idleness are commonly attended with misfortune and contempt; what do I but appeal to consciousness concerning the truth of the propositions I advance? If I gain not immediate assent, all I can do to procure it is, to enumerate examples by which the opinions I maintain have been verified, and to hold forth these as documents of general consciousness in support of the judgment I have formed. In a word, in all these subjects the most satisfactory evidence and the best theories are founded on the nature of the human constitution. The most sagacious and successful moralists, politicians, critics, and observers of human affairs, ground their maxims and their observations on the qualities of the mind, of which they are conscious themselves, or of which they discover that others are conscious.

Intuition is another copious source of knowledge, and *communicates conviction of the truth of all those propositions which are denominated self-evident.* Intuition is the perception of the agreement or disagreement of two ideas on bare juxtaposition, without the

intervention of any third idea; and the proposition which expresses our judgment of that agreement or disagreement is said to be supported by intuitive evidence.* All the axioms of mathematics and arithmetic, as, "Two straight lines cannot contain a space," "Things equal to the same thing are equal to one another," "Two and three are equal to five," "Two and three are not equal to six;" all the principles adopted in physical science, as, "A body cannot be in two places at the same time," "Nothing can produce nothing," "It is impossible for the same thing to be and not to be;" all the maxims relative to identity, as, "Matter is matter," and "Spirit is spirit;" form intuitive propositions. All certain reasoning, commonly called demonstration, must begin with a comparison of two ideas expressed by an intuitive proposition; and every proposition expressive of the agreement of any two intermediate ideas, or of every successive step of the demonstration, must be intuitive. These are the chief cases of intuitive truth. I must, however, observe, before I leave this topic, that *axioms*, of which some philosophers seem to be so fond, and which they hold forth as the foundations of all science, appear so far

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[* Truths are known to us in two ways: some are known directly, and of themselves; some through the medium of other truths. The former are the subjects of intuition; the latter, of inference. The truths known by intuition are the original premises from which all others are inferred. Our assent to the conclusion being grounded upon the truth of the premises, we never could arrive at any knowledge by reasoning, unless something could be known antecedently to all reasoning.

The object of logic is to ascertain how we come by that portion of our knowledge (much the greatest portion) which is not intuitive; and by what criterion we can, in matters not self-evident, distinguish between things proved and things not proved, between what is worthy and what is unworthy of belief. Of the various questions which the universe presents to our inquiring faculties, some are soluble by direct consciousness, others only by means of evidence. Logic is concerned with these last.—*Mill's Logic*, pp. 8, 12.]

from being such, that no reasoning is ever founded on them, and that they *are of no essential use in a course of reasoning.* What is an axiom? It is a general proposition, including a number of particular cases, and declarative of an intuitive truth, which truth must be as obvious, when surveyed in any of the particular cases, as in the general proposition; and, if this be true, the axiom cannot be of any use, for the application of it to the particular case can afford no light which the mind did not possess before that application. I shall illustrate this remark by a few examples, which will make it very plain.

If I say that two and three are equal to four and one, I am perfectly satisfied of the equality of these two quantities, before the application of the axiom, that "Things equal to the same thing are equal to one another," and before I add, that they are both equal to five. The axiom adds no light to my conceptions. It does no more than repeat, in general terms, what was expressed more simply, if not more intelligibly, in particular terms. If from two lines, each a mile long, I take away respectively a half mile, I cannot question a moment, that the remaining half miles are equal to one another, although I had never heard of the axiom, "If equals are taken from equals, the remainders will be equal." If from a field of an acre in extent, I take away half an acre, and throw it into an adjacent field, I have the most entire conviction that the extent of the first field will be much less than it was before the division, without having recourse to the axiom, "The whole is greater than a part." If I infer that something must have existed from eternity, because something now exists, my conviction is complete, before I reflect on, or perhaps know, the scholastic maxim, "Ex nihilo nihil fit," "Nothing can produce nothing." If I am certain that the sun is above the horizon, I conclude with entire confidence, that he is not also below it, although I am unacquainted with the axiom, "Bodies cannot be in different places at the same time." If, having two lines, one half a mile, and the other a quarter of a mile long, I add to each a whole mile, I am perfectly satisfied that the new line, composed of the mile and half, is longer than that composed of the mile and the quarter. I procure no additional conviction whatever from the application of

the axiom, "If equals be added to unequals, the wholes will be unequal."

What judgment, then, shall we hold concerning these axioms, which have made so much noise in the world, which have been considered as the foundations of science, the dictates of common sense, the first principles of knowledge, and of which even the mathematicians, the most accurate of all logicians, appear to be so fond? We cannot hesitate, I think, to admit, though they supply the appearance of sagacity and attention, yet that they are of little importance in reasoning, and that from them no useful truth can be derived. From all the examples I have produced, it is apparent that they are general expressions of truths, which are at least as obvious in the particular cases included under these general expressions. Of what service, then, can they be, unless they should help us to discover new particular cases, with which we were formerly unacquainted? But this service they cannot perform, for the axiom is not applicable till we have found, by other means than by its aid, that under it is comprehended the particular case.

Neither are they of any use to silence skeptics or perverse reasoners, who may be disposed to controvert the plainest truths.

Suppose, for example, I should be told that four and two are not equal to five and one, though both are equal to six, and that I might silence such an absurd reasoner by the help of the axiom, "Things equal to the same thing, are equal to one another;" how should this axiom silence him? Does it furnish any new evidence? No! Have I given any proof of it? No; it needs none. Why, then, is he bound to believe it? because he gave his assent to it on learning mathematics, and all men admit it to be true. But might he not have withheld his assent in learning mathematics, as well as now, since no proof was then pretended to be given? Do not all men assent as readily, that four and two are equal to five and one.

as they do to the axiom, "Things equal to the same thing, are equal to one another?" The axiom has no evidence to command assent, which every case included in it has not; and if any reasoner be so absurd as to controvert either the axiom or the case, he should be permitted to remain in error, as unworthy or incapable of conviction. The fair inquirer has then reached the true principles of argumentation, not axioms, but the perception of the agreement of ideas, and he must remain satisfied, for the nature of things and the faculties of the human mind admit no higher evidence.

That axioms are superfluous, even in mathematical reasoning, seems to be obvious from the manner in which Euclid himself sometimes employs them. He generally mentions them when the cases they include occur, but he sometimes reasons without them. He adopts some propositions as axioms, while he rejects or neglects others equally important, and equally entitled to attention.

I shall produce a curious example of his practice in this article, which I believe has not been commonly observed. He proposes, as axioms, that "Things, doubles or halves of the same thing, are equal." Nobody can doubt their truth, but why did he not inform us that he might propose many more axioms of the same sort? that "Things triple, quadruple, ten times, a hundred times, any number of times the same thing, are equal to one another;" which are equally true, if not equally necessary, with those he has thought proper to specify. He should at least have introduced one more of these axioms, namely, that things quadruple of the same thing are equal, because without it, if axioms are necessary in mathematical reasonings, one of his demonstrations is inconclusive and incomplete.

The demonstration to which I allude is found in the eighth proposition of the second book of the Elements, where he infers that two quantities are equal, because each of them is quadruple of a third quantity, though he has produced no axiom which holds forth this truth. Euclid cannot be defended by maintaining that the equality of all quantities, equimultiples of the same quantity, is implied in the axioms which assert, that "Things, doubles or halves of the same things, are equal;" because the truth which

in the proposition quoted, he assumes without an axiom, is not more evident than the truths are, to which he has applied axioms. Besides, the accuracy of mathematical reasoning and expression certainly required that Euclid should have said so, if he intended to include the equality of all equimultiples of the same quantity in that of the halves or doubles of it. The better account of the matter seems to be, if an axiom was unnecessary in one of these cases, it was equally so in any other; but that, as the cases of the equality of the doubles and halves of the same quantities frequently occurred, they had the good fortune to be honored with axioms to support them; though the conviction of the mind, and the legitimacy of the demonstration, were as complete without them as with them.

Reasoning supports an exceedingly numerous class of propositions, more numerous, I believe, than all the other kinds of evidence put together. But I mean not now to discuss the nature of it, nor to explain the different degrees of evidence it supplies. That task belongs to the third part of this course, and it is not my intention to anticipate it. I mean to mention here only the extent of these propositions, or the various branches of knowledge which it is the purpose of reasoning to establish and support. Almost all the propositions, then, of science, most of those of the arts and of business, in a word, those of all cases in which the mind receives either certain or probable conviction by the exercise of its rational faculties, belong to this class. It is not easy to explain the nature of these propositions without discussing the different kinds of evidence by which they are supported. I therefore defer the illustration of them till I treat of that evidence.

Testimony was the last source of knowledge, and *the last species of evidence* which I purposed to explain. It is founded in the trust we repose in the veracity of our fellow-creatures, in their intercourse with one another, and is of very extensive use. All the credit of history, all the intelligence of places, men, and things.

we cannot in person examine: all the security society can confer on life and property in courts of justice; all the information of business and social life, depend entirely on the opinion we have that men will tell truth in their communications to one another. In many cases the evidence of testimony affords a high degree of satisfaction; but the degrees of satisfaction decrease, till they degenerate into that equivocal state, in which probability for and against truth are so equally poised as to leave the mind in a state of suspense.

Two causes chiefly induce us to distrust the credibility of testimony—suspicion that the relator was not fully informed, or that his interest might influence him to utter falsehood. The presence of either or of both of these causes is a sufficient reason for hesitation. But where neither takes place, we seem to have no reason to distrust the information of testimony. Truth is congenial to the mind of man. It is more easy to tell truth than to utter falsehood. It is not easy to utter falsehood with success. Some time must elapse before the mind can acquire those habits and that composure which are necessary to secure falsehood from the inconsistency and embarrassment which instantly proclaim its baseness and its insincerity. Though the evidence of testimony cannot be deemed equivalent to that of demonstration, or to that of the senses, yet in most cases it would be ridiculous to indulge the least suspicion.

That there are such cities as Paris, Rome, or Pekin, that Alexander conquered a great part of the western quarter of Asia, and that Julius Cæsar was killed in the senate-house, are all facts of which we cannot entertain the smallest doubt. The conviction we have of the truth of such facts is called certainty, and the impression made on the mind by the evidence of testimony in general is termed *belief*. The impression which results from divine testimony, or the evidence of revelation, has obtained the name of *faith*. But a future opportunity will display more fully the credibility of testimony.

OF INFERENCE, OR REASONING, IN GENERAL.

(Extracted from Mill's Logic, pp. 108–112.)

[We say of a fact, or statement, that it is proved when we believe its truth by reason of some other fact or statement from which it is said to *follow*. Most of the propositions, whether affirmative or negative, universal, particular, or singular, which we believe, are not believed on their own evidence, but on the ground of something previously assented to, and from which they are said to be *inferred*. To infer a proposition from a previous proposition or propositions; to give credence to it, or claim credence for it, as a conclusion from something else, is to *reason*, in the most extensive sense of the term. There is a narrower sense in which the name reasoning is confined to the form of inference which is termed ratiocination, and of which the syllogism is the general type.

§ 1. There are some *cases in which the inference is apparent, not real, and which must not be confounded with cases of inference properly so called.*

This occurs when the proposition ostensibly inferred from another appears, on analysis, to be merely a repetition of the same, or part of the same, assertion, which was contained in the first. All the cases mentioned in books of logic as examples of equivalence of propositions, are of this nature. Thus, if we were to argue—"No man is incapable of reason, for every man is rational;" or, "All men are mortal, for no man is exempt from death," it would be plain that we were not proving the proposition, but only appealing to another mode of wording it, which may or may not be better adapted to suggest the real proof, but which contains in itself no shadow of proof.

Another case is where, from a universal proposition,

we affect to infer another which differs from it only in being particular; as, "All A is B, therefore some A is B;" "No A is B, therefore some A is not B." This, too, is not to conclude one proposition from another, but to repeat a second time something which had been asserted at first, with the difference that we do not here repeat the whole of the previous assertion, but only an indefinite part of it.

A third case is where, the antecedent having affirmed a predicate of a given subject, the consequent affirms of the same subject something already connoted (implied) by the former predicate; as, "Socrates is a man, therefore Socrates is a living creature"—where all that is connoted by living creature was affirmed of Socrates when he was asserted to be a man. If the propositions are negative, we must invert their order, thus: Socrates is not a living creature, therefore he is not a man; for if we deny the less, the greater, which includes it, is already denied by implication. These, therefore, are not really cases of inference; and yet the trivial examples by which, in manuals of logic, the rules of the syllogism are illustrated, are often of this ill-chosen kind, demonstrations in form, of conclusions to which whoever understands the terms used in the statement of the data, has already and consciously assented.

The most complex case of this sort of apparent inference, is what is called the conversion of propositions, which consists in making the predicate become a subject, and the subject become a predicate, and framing out of the same terms, thus reversed, another proposition, which must be true if the former is true. Thus, from the particular affirmative proposition, "Some A is B," we may infer that, "Some B is A." From the universal negative, "No A is B," we may conclude that, "No B is A." From the universal affirmative proposi-

tion, "All A is B," it cannot be inferred that, "All B is A;" though all water is liquid, it is not implied that all liquid is water, but it is implied that some liquid is so; and hence the proposition, "All A is B," is legitimately convertible into, "Some B is A." This process, which converts a universal proposition into a particular, is termed conversion *per accidens*. From the proposition, "Some A is not B," we cannot even infer that, "Some B is not A;" though some men are not Englishmen, it does not follow that some Englishmen are not men. The only legitimate conversion, if such it can be called, of a particular negative proposition, is in the form, "Some A is not B," therefore, "Something which is not B is A," and this is termed conversion by contraposition. In this case, however, the predicate and subject are not merely reversed, but one of them is altered. Instead of [A] and [B], the terms of the new proposition are [a thing which is not B], and [A]. The original proposition, "Some A *is not* B," is first changed into a proposition equivalent to it, "Some A *is* 'a thing which is not B;'" and the proposition, being now no longer a particular negative, but a particular affirmative, admits of conversion in the first mode, or, as it is called, *simple* conversion.

In all these cases there is not really any inference; there is in the conclusion no new truth, nothing but what was already asserted in the premises, and obvious to whoever apprehends them. *The fact asserted in the conclusion is either the very same fact, or part of the fact, asserted in the original proposition.* This follows from our previous analysis of the import of propositions. When we say, for example, "Some lawful sovereigns are tyrants," we mean to assert that the attributes connoted by the term "lawful sovereign," and the attributes connoted by the term "tyrant," sometimes coexist

in the same individual. Now this is also precisely what we mean when we say that some tyrants are lawful sovereigns; which, therefore, is not a second proposition inferred from the first, any more than the English translation of Euclid's Elements is a collection of theorems different from and consequences of those contained in the Greek original.

Again, if we assert, "No great general is a fool," we mean that the attributes connoted by "great general," and those connoted by "fool," never coexist in the same subject; which is also the exact meaning which we express when we say, that no fool is a great general.

When we assert that all quadrupeds are warm-blooded, we assert, not only that the attributes connoted by "quadruped," and those connoted by "warm-blooded," sometimes coexist, but that the former never exist without the latter. Now, the proposition, "Some warm-blooded creatures are quadrupeds," expresses the first half of this meaning, dropping the latter half, and, therefore, has been already affirmed in the antecedent proposition, "All quadrupeds are warm-blooded;" but that *all* warm-blooded creatures are quadrupeds, or, in other words, that the attributes connoted by "warm-blooded" never exist without those connoted by "quadrupeds," has not been asserted, and cannot be inferred. In order to reassert, in an inverted form, the whole of what was affirmed in the proposition, "All quadrupeds are warm-blooded," we must convert it by contra-position, thus: "Nothing which is not warm-blooded is a quadruped." This proposition, and the one from which it is derived, are exactly equivalent, and either of them may be substituted for the other; for, to say that when the attributes of a quadruped are present, those of a warm-blooded creature are present, is to say, that when the latter are absent the former are absent.

In a manual for young students, it would be proper to dwell at greater length upon the conversion and equipollency (equivalence) of propositions. For, although that cannot be called reasoning or inference which is a mere reassertion in different words of what had been asserted before, there is no more important intellectual habit, nor any the cultivation of which falls more strictly within the province of the art of logic, than that of discerning rapidly and surely the identity of an assertion when disguised under the diversity of language. That important chapter in logical treatises which relates to the opposition of propositions, is of use chiefly for this purpose. Such considerations as these, that *contrary* propositions may both be false, but cannot both be true; that *sub-contrary* propositions may both be true, but cannot both be false; that of two *subalternate* propositions, the truth of the universal proves the truth of the particular, and the falsity of the particular proves the falsity of the universal, but not *vice versa* —are apt to appear, at first sight, very technical and mysterious, but when explained, seem almost too obvious to require so formal a statement, since the same amount of explanation which is necessary to make the principles intelligible would enable the truths which they convey to be apprehended in any particular case which can occur.* In this respect, however, these

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* All A is B, / No A is B, } contraries.

Some A is B, / Some A is not B, } sub-contraries.

All A is B, / No A is B, } contradictories.

No A is B, / Some A is B, } also contradictories.

All A is B, / Some A is B, / and / No A is B, / Some A is not B, } respectively subalternate.

axioms of logic are on a level with those of mathematics.

§ 2. Having noticed, in order to exclude from the province of reasoning, or inference properly so called, the cases in which the progress from one truth to another is only apparent, the logical consequent being a mere repetition of the logical antecedent; we now pass to those which are *cases of inference in the proper acceptation of the term*, those *in which we set out from known truths, to arrive at others really distinct from them.*

Reasoning, in the extended sense in which I use the term, and in which it is synonymous with inference, is popularly said to be *of two kinds:—reasoning from particulars to generals, and reasoning from generals to particulars;* the former being called *induction*, the latter, ratiocination, or *syllogism.* It will presently be shown that there is a third species of reasoning, which falls under neither of these descriptions, and which, nevertheless, is not only valid, but the foundation of both the others.

The meaning intended by the above expressions is, that *induction* is inferring a proposition from propositions *less general* than itself; and *ratiocination* is inferring a proposition from propositions *equally* or *more* general. When, from the observation of a number of individual instances, we ascend to a general proposition; or when, by combining a number of general propositions, we conclude from them another proposition still more general, the process, which is substantially the same in both instances, is called induction. When from a general proposition, not alone (for from a single proposition nothing can be concluded which is not involved in the terms), but by combining it with other propositions, we infer a proposition of the same

degree of generality with itself, or a less general proposition, or a proposition merely individual, the process is ratiocination. When, in short, the conclusion is more general than the largest of the premises, the argument is commonly called induction; when less general, or equally general, it is ratiocination.

Induction is, without doubt, a process of real inference. The conclusion in an induction embraces more than is contained in the premises. The principle or law collected from particular instances, the general proposition in which we embody the result of our experience, covers a much larger extent of ground than the individual experiments which are said to form its basis. A principle ascertained by experience is more than a mere summing up of what we have specifically observed in the individual cases that we have examined; it is a generalization grounded on those cases, and expressive of our belief, that what we there found true, is true in an indefinite number of cases which we have not examined, and are never likely to examine. In every induction we proceed from truths which we know, to truths which we did not know; from facts certified by observation, to facts which we have not observed, and even to facts not capable of being now observed; future facts, for example, but which we do not hesitate to believe upon the sole evidence of the induction itself. —*Mill's Logic*, pp. 108–112.]

[We return now to Professor Barron's Lecture.*]

I have now explained the nature of propositions; I have specified the different kinds into which they may be divided; and I have enumerated the principal sorts of evidence by which they are supported. From what I have advanced, it has appeared that all the proposi

[* For some excellent remarks on Induction and Deduction, from Thomson's Laws of Thought, refer to the concluding chapter of this volume.]

tions into which knowledge may be formed, are resolvable into an affirmation or negation of the agreement of the two terms or ideas of which they consist; and that the judgment the mind passes on this agreement or disagreement, is then proper and just, when it corresponds to the degree of evidence by which the proposition is supported. The perfection of judgment is, to compare our ideas fairly and candidly, either by juxtaposition, as in the case of intuitive propositions, or by the intervention of intermediate ideas, when proof is requisite, and to pass a decision on that comparison, according to truth and justice, unbiased by partiality or prejudice, unseduced by fallacious appearances in things, ambiguities in words, or any disposition to deceive, or to be deceived.

As, then, the purpose of all our inquiries is, to discover truth and knowledge, and as the completion of this discovery consists in discerning the agreement or disagreement of our ideas, it is plain that we cannot proceed one step without having constant recourse to the operation of judgment. We exert it immediately in cases of intuition; we exert it at the conclusion of every process of reasoning, in determining whether two principal ideas agree or disagree; and we exert it in every step of that process, in deciding concerning the agreement or disagreement of each couple of intermediate ideas. The candid inquirer, therefore, should study to preserve his mind in a state fitted to perform this operation in a proper manner, and to divest it of all obstructions or incumbrances which may interfere with its success. Without this precaution, it is vain to pretend to discover truth, because we shall only perplex and discompose our minds, spend our time in irksomeness to ourselves, in disturbance to others, and sink deeper in falsehood and in error. After all the candor and

patience we can exercise, the investigation of knowledge is a painful and laborious task; but our labor and time are totally thrown away, without a legitimate exertion of judgment. *It is, therefore, a matter of the highest importance, in searching for truth, to know those impediments which obstruct the rectitude of our judgments, and to learn the rules we must observe, in order to conduct them with justice and expedition.* This is a subject deserving most serious attention, and must not be forgotten in a system of logic.

Erroneous judgments are denominated prejudices, or rash judgments; that is, judgments passed before we have duly examined all the circumstances of the case on which we intend to decide. Prejudices generally relate to opinions; prepossessions, to attachments: the former refer chiefly to things, the latter to persons. But I intend here that prejudices should comprehend all the impediments which interfere with our forming [right] judgments of every sort, whether respecting things or persons. *Prejudices are arranged by Lord Bacon under four heads*, which he calls, in the language of the schools, *Idola Tribûs*, the prejudices of the species; *Idola Fori*, the prejudices of language; *Idola Specûs*, the prejudices of the individual; and *Idola Theatri*, the prejudices of authority. These terms, though scholastic, are extremely significant. It is seldom we find the language of the schoolmen so replete with meaning. Prejudices are not improperly distinguished by the title of Idola; because they occupy the place of truth in the mind, in the same manner as the idol attracts in the temple the devotion which belongs to the Author of nature.

The *Idola Tribûs* are the prejudices common to all mankind, and arise from the natural imbecility and vanity of the mind, or from the influence which imagina-

tion, passion, affection, and attachment have upon the operations of the understanding. The *Idola Fori* include the erroneous judgments into which we are led by the inaccuracy or the abuse of language. The *Idola Specûs* comprehend those prejudices which result from peculiar circumstances, from constitution of mind or body, from education, from habit, or from accident. The *Idola Theatri* are the errors into which we are decoyed by public opinion, by authority, by custom, by fashion, or by any other means which mankind employ to pervert the judgments of one another. These divisions contain, if not all, at least the chief materials of our prejudices. I shall therefore resume them, and point out the particulars contained under each. I begin with the *Prejudices of the species.*

Though the human understanding, assiduously employed and properly directed, might have proceeded much farther than it has done in the investigation of knowledge, yet, so limited are its powers, that there is much reason to apprehend its progress, in the most favorable circumstances, cannot be very great. Thousands of subjects daily occur, concerning which we are totally ignorant, and concerning which any industry we can exert cannot be supposed to remove that ignorance.

The substance and many of the operations of all existences, corporeal and spiritual, are now, and perhaps will remain, altogether unknown. We comprehend nothing of either, but a few of their qualities. All the assimilating powers of nature, by which animals are produced, and reared, and live, and act, by instinct or design; by which plants grow to various sizes, consist of texture so different, display colors so beautiful and so numerous; and by which minerals so precious, and so dissimilar, are formed in the bowels of the earth; constitute an immense field of inquiry, in a great measure beyond our reach. All investigations which involve the idea of infinity, whether with regard to excellence, space, or time, exceed our comprehension; because of infinity we have no adequate con-

ception, and can only approach it negatively by discovering what it is not. All inquiries, also, about futurity, however anxiously pursued by men in all ages and situations, surpass the human powers of research, if we except the very short progress which the sagacity of some men may make, guided by the imperfect and fallible aid of experience and analogy.

Limited, then, as the mind of man is in its inquiries, by the nature of many subjects themselves, and numerous as still are the fields of accessible knowledge, untouched or unexplored; such, notwithstanding, is its vanity, its folly, or its presumption, that more perhaps of its time and its industry has been employed in searching for what is not to be found, than in investigating what is useful and intelligible.

Is it not deplorable, that so much ingenuity should have been thrown away, even in enlightened times, on skeptical and useless inquiries concerning the nature and existence of matter and spirit, without attending to what is of real importance, the qualities and operations of both, from which useful knowledge concerning them might have been deduced? Is it not equally lamentable, that the true method of prosecuting the study of nature should have been unknown till the days of Lord Bacon? and that philosophers should have been so misled, or so absurd, as to retire to their closets, and to form theories to account for the phenomena of the heavens and the earth, without consulting the facts which they every day beheld?

But all the abuses and misapplications of human ingenuity combined, furnish nothing equal to those of the schools for near five hundred years, from the middle of the eleventh century to the revival of learning in the sixteenth. Never did any set of philosophers labor so strenuously and successfully to enlighten the mind of man, and to promote the discovery of truth, as the schoolmen did to confound all human inquiry, and to interrupt all progress in knowledge. Never were subtilty and ingenuity employed so preposterously, in pretending to teach the method of investigating truth, and exposing error, without communicating any useful information.*

[* "The works of Aristotle, translated into barbarous Latin, formed the groundwork of what has been called the philosophy of the schoolmen; who

LECTURE VI.

PREJUDICES.

VANITY and presumption have not been engaged more successfully in obstructing the progress of general knowledge, than the imagination, the passions, and self-interest, have been employed in clouding the mind with prejudices respecting society, business, arts, and social intercourse. National partialities are so insuperable in the most enlightened and civilized periods, that it seems impossible for the people in general of any nation, to do justice in the judgments they form, of the capacity, the ingenuity, the courage, or the integrity of their rivals.

The proud Jews of old treated all the rest of mankind with contempt; and if they admitted them to be creatures of the Author of nature, they accounted them unworthy of his care, monopo-

never rightly understood Aristotle, and enlarged and disfigured his logic by endless and insignificant commentaries. The school-logic was taught in all universities before the Reformation, and in not a few of them since. It was, indeed, almost the only thing that was then taught in those seminaries; and so eagerly was it run after, that Duns Scotus, a great teacher of it at Oxford, is said to have had at one time twenty thousand scholars. This is not probable; and, if true, can be accounted for in no other way than by supposing that, in an ignorant age, the man who could dispute, or speak fluently, would be admired as a prodigy, and might acquire among the common people what influence he pleased. It is to be observed, too, that the school-logic was found to be a good support to the Romish religion, and was by the Church of Rome patronized accordingly. For this logic, by confining men's minds within the narrow circle of its own rules, and making them more attentive to words than to things, and totally regardless of nature, checked all freedom of inquiry; and, by promoting a habit of arguing against one's belief, as well as for it, had a tendency to prevent serious thinking, to harden the heart, to pervert the understanding, and to make men indifferent about the truth."—*Beattie's Moral Science*, pp. 555-6.]

lizing his attention and his providence to themselves. The Greeks, vain of their enterprise, their learning, and their arts, considered all other nations, even the refined and luxurious Persians, as barbarians, and held in little estimation their manners, their arts, and their fidelity. The Athenians represented their rivals, the Spartans, as ignorant, rude, ambitious, and as destitute of every quality except stratagem and patience. The Spartans retaliated the opprobrious epithets of fickle, factious, sophistical, impertinent; of restless, loquacious, turbulent, and ostentatious. The Romans, like the Greeks, stigmatized with the appellation of barbarous the rest of the world. They vilified the military character of the Carthaginians and Macedonians. They ridiculed the mercantile spirit of the former, converted their national faith into a proverb of reproach, and scarcely left them a single civil virtue.

But, though superior liberality of sentiment certainly prevails in modern times; and nations, having much more intercourse, survey their neighbors with less aversion and suspicion; yet there is scarcely to be found, even among men of letters, that candor and generosity which, disdaining all partial and local attachments, constitute the philosopher the citizen of the world. All the civilized nations, I believe, of modern Europe, discover among their countrymen knowledge, genius, and industry, superior to what are to be found in similar circumstances among any of their neighbors. The French, the English, the Italians, will not, I conceive, readily yield to one another precedency in science or arts.

In private life, the prevalence of imagination, of passion, and of attachment, extinguishes almost every ray of impartiality and justice in the judgments of men. The *power of imagination* is so prevalent in some minds as to render them altogether impatient under the irksome operation of comparing ideas; and they hasten to any judgment, however erroneous, rather than continue in a state of suspense. The greater part of mankind are guided more by their imagination and feeling

than by reason. An analogy or a figure influences them more than an argument. They will go with the multitude, however misguided, rather than stand single on the side of justice and truth.

The passions pervert judgment still more than the imagination, and there is hardly any thing we wish to think right and reasonable, which we will not quickly find arguments for judging to be so. The spirit of party, and the passions it prompts, appear on many occasions to eradicate every idea of equity, candor, and consistency. Men oppose to-day what they supported yesterday; they reprobate measures as void of faith, honor, and integrity, which they formerly maintained to be the result of wisdom and discernment, and the source of the most important public good. When our own interest comes in competition with that of others, it is almost impossible to survey the subject of dispute with an impartial eye. In all such cases, men of candor, conscious of their imperfection, renounce judgment altogether, or endeavor to contemplate their situation and attachments in the light they could view those of neutral persons. It is, indeed, exceedingly difficult to emancipate the mind entirely from these causes of erroneous judgment; but every inquirer should make the attempt, as he may be assured his researches otherwise will never be attended with pleasure or success.

[Some important suggestions on this subject we here subjoin, from Dr. Watts. Logic, Part ii., chap. iii. The various passions or affections of the mind lead the judgment astray from truth. It is love that makes the mother think her own child the fairest, and will sometimes persuade us that a blemish is a beauty. Hope and desire make an hour of delay seem as long as two or three hours. Hope inclines us to think there is nothing too difficult to be attempted. Despair tells us that a brave attempt is mere rashness, and that every difficulty is insurmountable. What could persuade the wise men and philosophers of a popish country to believe the

gross absurdities of the Romish Church, but the fear of torture or death, the galleys or the Inquisition?

The *fondness we have for self*, and the relation which other persons bear to ourselves, furnish us with another long list of prejudices. We are generally ready to fancy that every thing of *our own* has something peculiarly valuable in it, when indeed there is no other reason but because it is our own. We entertain the best opinion of the persons of our own party, and easily believe evil reports of persons of a different sect or faction. We set up our own opinions in religion and philosophy as the tests of orthodoxy and truth. We are thus tempted to pervert even the sacred books of Scripture to make them speak our own sense. When our own inclination, or ease, or honor, or profit tempt us to the practice of any thing, how do we strain our thoughts to find arguments for it, and persuade ourselves it is lawful!

In matters of equity between man and man, our Saviour has taught us to put my neighbor in place of myself, and myself in place of my neighbor, rather than be bribed by this corrupt principle of self-love to do injury to my neighbor.

Again, the peculiar *tempers* and *humors* of the mind influence the judgment and occasion many mistakes. The *credulous* man is ready to receive every thing for truth that has but a shadow of evidence; he is ready to resign his own opinion to the first objection which he hears, and to receive any sentiments of another that are asserted with a positive air and with much assurance. The man of *contradiction* stands ready to oppose every thing that is said. He gives but slight attention to the reasons of other men, from an inward scornful presumption that they have no strength in them.

Again, the *dogmatist* is sure of every thing, and the *skeptic* believes nothing. The former adopts his opinions hastily and on insufficient grounds, and then will hear no arguments to the contrary: the latter will not take pains to search things to the bottom, but when he sees difficulties on both sides, resolves to believe neither of them.

Some men believe a doctrine merely because it is ancient, others because it is new: some will not believe a proposition in theology if it is mysterious, while others would on that account receive it more readily.]

The *Idola Fori*, *which originate from language*, the great instrument of social communication, form the

second class of prejudices. The principal inconveniences they occasion, result from the use of words which have no meaning, or which bear, in our apprehension, a meaning more or less extensive than they ought to have. I am, however, fortunately relieved from the necessity of recapitulating and exposing them, by what I advanced in a former lecture concerning the ambiguities of general terms, and the manner of ascertaining them by enumeration. What I there observed refers, indeed, to the enunciation of single ideas; but no more is necessary to obtain a distinct and just judgment. If language exhibit single ideas perspicuously and fully, it has done all that can be expected from it. If an erroneous judgment shall still be passed, the understanding must bear the blame, while the expression will deserve no censure.

The *next class of prejudices*, denominated *Idola Specûs*, include all *those errors in judgment into which men are seduced from circumstances peculiar to themselves, from the constitution of their minds or bodies, rank in life, education, or course of study.*

Infinite, almost, is the variety of the external appearance of the human race, and no less various, perhaps, are the constitutions of the minds of men.* For this reason unanimity is not to be looked for, even concerning business and the common intercourse of life, far less concerning speculative tenets of difficult conception, probably in some cases of exceptionable evidence. If judgments are formed by candid men on such topics,

[* Some men have a native obscurity of conception whereby they are hindered from attaining clear and distinct ideas. Some have a defect of memory, so that they are not capable of comparing their present ideas with a great variety of others, in order to secure themselves from inconsistency in judgment. Others scarcely ever take a survey of things wide enough to judge wisely and consistently. See *Watts*, part ii. chap. iii.]

they will be different, suitable to the different aspects in which the objects appear to their respective apprehensions. No inconvenience ensues from these different judgments, either in affairs or in speculation, if men are animated by charity and proper respect for the opinions of their neighbors as well as for their own. They add variety to conversation and to action, correspondent to the difference which nature has established in the individuals of the species. They inspire patience and toleration, which afford exercise for several of the most amiable and social virtues.

If any nation, then, or large society of men, pretend to be unanimous about tenets speculative in their nature and remote from vulgar comprehension, those of religion itself not excepted, the whole almost of the judgments from which that unanimity springs must be indigested if not inadequate; that is, they must be the judgments of teachers or leaders, adopted without examination. Their followers are generally incapable of forming opinions for themselves, on account either of the imbecility of their faculties or the abstract nature of the topics; and of course their assent, founded on pretended judgment, is no better than acquiescence in the judgments of those they revere, concerning subjects which they do not fully understand.

Education, the professed purpose of which is to lead us to the temple of truth by the easiest and shortest road, will not readily be supposed to retard or embarrass our progress in that course in which it pretends to be a guide. It is, however, certain, that no station we can occupy, no discipline we can undergo, is more frequently *prolific of partial judgments*.*

[* How many fooleries are instilled into us by our nurses, our fellow-children; by servants or unskilful teachers, which are maintained through life! We choose our particular sect and party in the civil, the religious

In all periods of society, teachers have too commonly been more concerned to inculcate the philosophy of their sect, or the religion of their church, than the pure doctrines of truth; and the inexperience of youth, with the respect they naturally entertain for advanced years and superior wisdom, cannot often fail to render such education a hot-bed of errors and prejudices. History and experience teem with examples of the fertility of this soil, and teach, in the strongest language, the necessity of the most assiduous attention, to prevent or eradicate the plentiful crop of noxious plants with which it is in hazard of being overrun.

The *fundamental error*, perhaps, *of education*, has consisted in addressing truth, whether prudential, moral, or philosophical, to the memory rather than to the understanding. It is commonly supposed, if a great deal of information be lodged in the mind, and committed to the custody of faithful recollection, that it will prove a plentiful and useful magazine, from which the pupil may draw with facility and advantage every supply he may need in the conduct of life. But it is unfortunately forgotten, that accumulation of truth is only half the business of instruction, and is not even the more important half. The more important part is to acquire the habit of employing to some good purpose the acquisitions of memory, by the exercise of the understanding about them; and, till this habit be acquired, these acquisitions will not be found of very great use.

With regard to *prudential truth*, or the conduct of a pupil respecting his instructors, his parents, his friends, his equals, his attachments and amusements, the great fundamental rule seems to be, that good behavior is both his duty and his interest, and that upon his ob-

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and the learned life, by the influence of education. The Turks are taught early to believe in Mahomet, the Jews in Moses; the heathens worship a multitude of gods, under the force of their education, and it would be well if there were not millions of Christians, who have little more to say for their religion than that they were born and bred up in it.— *Watts.*]

servation of it his treatment and gratifications will de pend.

If the uniform and discreet conduct of the teacher, or the parent, makes him consider what his behavior is, and forces him to reason about the practice of it, he will be happy and satisfied, he will be attentive and civil to others, and he will be prepared to judge for himself in the conduct of life, when he shall be obliged to think and act without direction. But if he have no rule of conduct but the dictates of every sudden whim which may arise in his own fantastic imagination, or which the occasional indulgence or severity of an indiscreet superintendent may suggest, his conduct will be the result of foolish attachments or aversions, of caprice, or of passion. His wants will be multiplied beyond the bounds of nature, and the circumstances of his situation; he will be miserable himself, disgusting to others. Advice and instruction will have with him no useful influence. His subjection to authority will be his utter aversion, because it interferes with his gratifications. His application to study will be disagreeable, because he has no conception of the utility of knowledge. From such a train of unfortunate prejudices, what other conduct can ensue than we often survey? Namely, a headlong career of the most unlimited gratification, as soon as he is emancipated from that mortifying restraint from which he has long wished so ardently to disengage himself; and an insurmountable aversion to every path of inquiry and truth, into which it had been the purpose of education to lead him.

Though these fatal consequences of improper instruction are fortunately not very frequent, yet numerous examples occur of *prejudices implanted by the authority of teachers*, relative to philosophical, political, and prudential truth, which have produced effects not a little detrimental. The lectures of philosophy in ancient Greece, tended more to inculcate the particular tenets of the Epicureans, the Stoics, and the Academics, than the science of human nature, and the doctrines of wisdom. Aristotle was perhaps more anxious to excite admiration, than to extend useful knowledge; to constitute a new sect of inquirers, than to promote the influ

ence of truth. From the abuse, at least of his logic, flowed a corruption of the education of Europe, which for many centuries not only did not point out, but obstructed every avenue to improvement.

That no ray of useful information should have transpired amid all the industry, and acuteness, and even ingenuity of the scholastic doctors, can only be explained from the vanity and futility of the learning they inculcated. When the art of reasoning itself was converted into an engine of sophistry and deceit, when the education of the most learned and elevated members of society consisted in subtle wrangling and syllogistic disputation, can we wonder that the understandings of men should be debased and disgraced by the admission of the most palpable inconsistencies, and that the stupendous fabric of Popish superstition, the most presumptuous system that ever insulted human reason, should have been then received and established?

The history of Great Britain presents two striking examples of the *pernicious effects of the prejudices of education*, one political, and the other religious. Charles the First lost his life and his crown by the arbitrary maxims of government he had received from his ancestors. James the Second lost his crown by the Popish education he had received in France.

Though Charles the First is commonly called a martyr to the doctrine and worship of the Church of England, and is accounted by the vulgar to have sacrificed his life in defending her against the bigotry and violence of sectaries, whose hatred to her and him was insatiable; yet it is well known, that his attachment to that church was neither the first nor the chief cause of the discontents which generated and prolonged the civil war. Religious jealousies and fears were then employed, as they have often been, to rouse, and irritate, and alienate the people. But the encroachments on property contrary to law, and the levying of money without consent of Parliament, alarmed all wise men, and excited that tremendous spirit of resistance which terminated in the lamentable fate of the monarch, and the destruction of the constitution, evils that seem to have exceeded in magnitude every wish or conception of the pa-

riots who first opposed the arbitrary measures of the crown. That Charles knew the constitution reprobated the levying of money by his own authority, we have no reason to doubt; but he had been fatally educated in principles which suggested, that cases of necessity, or the wants of princes, were superior to the constitution or the laws; and that, if Parliament refused to grant what supplies he thought necessary, a case of necessity took place, and he was at liberty to exert his sovereign power, to provide for the salvation of the state.

The education of James the Second in France, and his attachment to Popery, were the springs of the Revolution, and of the ejection of the family of Stuart from the throne of their ancestors. Nothing perhaps but the bigotry of that prince could have saved the liberties of this country from extinction. Could he have relinquished his attachment to Popery, could he have suspended or moderated that attachment, he might have reigned without a parliament, and trampled on the laws and religion of his subjects. His finances, by economy and good management, were in perfect order, and nearly adequate to the annual expenses of government. The calamities and disasters of the late civil wars were fresh in the memories of men, and all ranks were reluctant to renew them. The enthusiastic spirit which had inflamed the body of the nation against his father, had now nearly spent its force, and nothing seemed wanting to success but to allow the minds of men to cool, and to habituate them to the slavery that was preparing for them. The blind zeal, however, of the king, and his intemperate attachment to his religion, for the happiness of this land of liberty, hastened every event to a crisis. They so completely disgusted friends and enemies, that the people, with the most unprecedented unanimity, pushed from a throne, without violence or convulsion, a monarch and a family, who would have sacrificed the happiness and peace of a great nation to an absurd system of foreign superstition.

The *Idola Theatri* constitute the *last class of prejudices* of which I have to speak. They generate all those erroneous judgments which result from the malignant influence of society, and which may be comprehended under the *effects of party spirit, of fashion, and of authority.*

Party spirit has in all ages been the most formida

ble enemy to sound judgment in philosophy, in politics and in affairs. No man, it would seem, ever retained either discernment or candor to withstand its seduction, after allowing it to get possession of his breast. The only safety for the impartiality of the mind, the only means of preserving the solidity and equity of its decisions, is to fly from the evil, and to avoid the infection. If we advance within the sphere of its attraction, we are undone.

It would be endless to enumerate the examples of the baneful influence of this spirit, which history and experience so plentifully supply. Numerous and violent are the contentions it has produced in science, in religion, and in business. When engaged in a party, we retain no rule of judgment but the opinion of the people with whom we associate. Every thing they think, or say, or do, is right, proceeds from honorable and useful motives, and is directed to the accomplishment of some important end. All our friends are men of discernment, of integrity, of generosity, of liberal minds, of impartial views, and of great virtues. The case of our antagonists, their motives, qualities, and conduct, are directly the reverse. Their designs are the result of imprudence, folly, or iniquity. Weakness, wickedness, or selfishness, mark all their plans, and disfigure all their operations. They inherit no spark of discretion, enterprise, or public spirit. Truth is thus suppressed or misrepresented; and in all the subjects of contest, there will not be found, on either side, a single sound or impartial judgment.

Religious party spirit, in former ages, chiefly misled and agitated the minds of men. Happily for the honor and peace of the present age, the influence of this most malignant disposition is now nearly extinguished. The progress of truth and knowledge has not been a little

extended and accelerated by this fortunate event. Political party spirit, however, still keeps strong hold of the minds of men; and the misrepresentations and falsehoods with which it corrupts their hearts, and misleads their judgments, are sufficiently discernible. Did not attachment to party blind the understanding, and obliterate the feelings of modesty and candor, men would be ashamed of the contempt or neglect with which they receive the plainest truths. On some occasions, indeed, this spirit appears to prompt such partiality, as not only despises the dictates of truth and reason, but disregards even the most important interests of society, provided it may accomplish its favorite objects of ambition.

The *prejudices of fashion* seduce and pervert all mankind. Every thing feels its influence. All ranks are subjected to its power. Manners, arts, language, dress, amusements, studies, science, even laws and religion, are not exempted from its sway. Fashion is, on many occasions, the opinion of the majority of society, or of the more illustrious part of it; and so ductile are the minds of many men, that they consider its dictates as of superior authority to those of reason itself. Of all our prejudices, however, those supported by fashion are perhaps the most justifiable, at least they are often the most difficult to surmount. In all matters of indifference, it would seem, we should submit to fashion; and as we would not choose to follow any authority in judging of right and wrong, so it appears unreasonable to be singular in cases where neither is concerned.

[Fashion has a most powerful influence on our judgments, for it employs those two strong engines of *fear* and *shame* to operate upon our understanding with unhappy success. We are ashamed to believe or to profess an unfashionable opinion in philosophy, and a

cowardly soul dares not so much as indulge a thought contrary to the established or fashionable faith, nor act in opposition to custom, though it be according to the dictates of reason. I confess there is a respect due to mankind which should incline even the wisest of men to follow the innocent customs of their country in the outward practices of civil life, and in some measure to submit to fashion in all indifferent affairs, where reason and Scripture make no remonstrance. But the judgments of the mind ought to be forever free, and not biased by the customs and fashions of any age or nation whatsoever.— *Watts.*]

The *prejudices* of fashion are nearly allied to those of *authority.* They differ only in the extent of the source from which they are derived. Under the former, we are guided by the practice or opinion of the great body of the people; under the latter, we follow the opinions and example of eminent individuals. Authority is most detrimental to all inquiries after truth, and has perhaps obstructed more the progress of knowledge than all other causes conjoined. It has infested and corrupted the investigations of philosophy in all ages. Even the enlightened spirit of the present age is not altogether delivered from its dominion.

Whenever men pretend to teach knowledge, by adopting systems without consulting nature, the influence of authority must be unlimited and indisputable, because the inquirer has sought for no test of truth but the opinion of the author of the system. It is fortunate for knowledge that this mode of philosophizing is now exploded, and will never perhaps regain establishment. After reigning uncontrollably from the days of Aristotle to those of Descartes, it was consigned to oblivion, with all the speculations of this eminent projector, by the sound philosophy of Newton. The general prevalence

of the experimental method, recommended by Bacon, has gained entire ascendency in every enlightened nation of Europe.

Had the Cartesian mode of philosophizing continued to prevail, the true system of nature had remained unknown. It was the banishment of authority, and the investigation of nature, that revealed her secrets. If the influence of authority shall revive, the knowledge of these secrets may be withdrawn. Let, then, the opinions of every theorist be examined with perfect patience and impartiality, but never let his authority supply the place of argument.

[As sources of prejudice, the authority of our forefathers, and of ancient authors, is most remarkable. It is granted that the ancients had many wise and great men among them, and some of their writings, which time has delivered down to us, are truly valuable; but those writers lived rather in the infant-state of the world, and the philosophers as well as the polite authors of our age are properly the elders, who have seen the mistakes of the younger ages of mankind, and corrected them by observation and experience.

Some persons believe every thing that their kindred, their parents, and their tutors believe. I freely grant that parents are appointed by God and nature to teach us all the sentiments and practices of our younger years —and happy are those whose parents lead them into the paths of wisdom and truth. I grant, further, that when persons come to years of discretion, and judge for themselves, they ought to examine the opinions of their parents with the greatest modesty, and with an humble deference to their superior character; they ought, in matters perfectly dubious, to give the preference to their parents' advice, and always to pay them the first respect, nor ever depart from their opinions and prac-

tice, till reason and conscience make it necessary. But, after all, it is possible that parents may be mistaken, and therefore reason and Scripture ought to be our final rules of determination in matters that relate to this world and that which is to come.

To believe in all things as our predecessors did, is the ready way to keep mankind in an everlasting state of infancy, and to lay an eternal bar against the improvement of our reason and of our happiness.

Besides, let us consider that the great God, our common Maker, has never given one man's understanding a legal and rightful sovereignty to determine truths for others, at least after they are past the state of childhood or minority. No single person, how learned, and wise, and great soever, or whatsoever natural, or civil, or ecclesiastical relation he may have to us, can claim this dominion over our faith.

It is proper to take notice, however, that *as education, custom, and authority are no sure evidence of truth, so neither are they certain marks of falsehood;* for reason and Scripture may join to dictate the same things which our parents, our tutors, our friends, and our country believe and profess. Yet there appears sometimes in our age a pride and petulancy in youth, zealous to cast off the sentiments of their fathers and teachers, on purpose to show that they carry none of the prejudices of education and authority about them. They indulge all manner of licentious opinions and practices, from a vain pretence of asserting their liberty. But, alas! this is but changing one prejudice for another, and sometimes it happens, by this means, that they make a sacrifice both of truth and virtue to the vile prejudices of their pride and sensuality.

There is *another tribe of prejudices* which are more akin to those of authority, and that is, *when we receive*

a doctrine because of the manner in which it is proposed to us by others. Neither the positive, the awful or solemn, the terrible or the gentle methods of address, carry any certain evidence with them that truth lies on that side. In such a degenerate world as we live in, we must learn to distinguish well between the substance of any doctrine and the manner of address, either in proposing, attacking, or defending it—and thereby setting a just and secure guard of reason and conscience over all the exercises of our judgments, resolving to yield to nothing but the convincing evidence of truth, religiously obeying the light of reason in matters of pure reason, and the dictates of revelation in things that relate to our faith.— *Watts' Logic*, part ii. chap. iii.]

LECTURE VII.

RULES TO PREVENT PREJUDICES—PRINCIPLES AND RULES OF JUDGMENT.

I HAVE now treated pretty fully of prejudices, to prepare us to detect them, and to put us on our guard against them, because they are most detrimental in the investigation of knowledge. I intimated formerly, that I intended to point out, not only the rocks and shelves, which we must avoid, but to present the compass by which we must steer, in order to perform a successful voyage on the hazardous sea of inquiry. I proceed to perform this promise, and to conclude the branch of logic under discussion, by subjoining a few *rules* which must direct our practice, if we expect to form just and useful judgments.

1. *Beware of precipitation, and never decide concerning the truth or falsehood of any proposition, till you have attended to all the preliminaries formerly mentioned:* whether the words accurately express the ideas, whether you have distinct conceptions of the ideas, whether your minds are divested of prejudices, and whether you have fully canvassed the evidence.

I do not maintain that all this precaution is necessary to prevent mistake in every judgment we form. In all sciences, arts, and affairs, we pass many judgments without much attention or premeditation, because the agreement or disagreement of the ideas compared is obvious on the slightest inspection. But when the pursuit of truth solicits us into new, and perhaps obscure, paths of inquiry; when we reach judgments, which lead to inferences extraordinary and alarming; or, when our decisions differ from those of men eminent for capacity and discernment, or are likely to involve us in controversy, we should reiterate, with patient attention, every precaution.

Such a practice is suitable to, and is demanded by, the character of a candid inquirer. It may perhaps retard our progress, but it will cause us to march on surer ground. It will habituate our minds to accuracy, and will give us confidence in their operations. It will save the irksome sensation which results from the detection of precipitation and mistake; and it may prevent much trouble by excluding errors from theories, which, if carelessly or rashly overlooked in their principles, may lay in ruins the labor of many painful hours.

The most patient investigators have always been the most successful inquirers, and the most prudent and fortunate men have generally been most remarkable for the candor and the coolness of their understandings.

The two greatest philosophers the world ever saw, Lord Bacon and Sir Isaac Newton, are in nothing so much superior to all other philosophers, as in the deliberation and patience with which they proceeded in their researches. No confidence, no presumption, no vain censure of the precipitancy of former inquirers, no zeal for party, no partiality to system or authority, ever mislead their minds or disgrace their investigations. They seek truth alone, and they search for her with the caution of men conscious of her importance, and of the difficulty of finding her. They embrace her with cordiality wherever they meet her, but they will not adopt speculation for fact, nor be satisfied with the semblance in place of the reality.

Prudent judgment in business chiefly distinguishes the wise man from the fool. The fool frequently possesses sensibility, vivacity, recollection, and information. He is often in these articles superior to the man of wisdom and discretion, but he cannot, or will not, make a proper use of the materials he has provided. He finds ideas to agree which do not agree. He judges precipitately and erroneously. His conduct is directed by his judgments. His opinions, accordingly, expose him to ridicule and contempt, and his actions to reproach and misfortune.

The essence of wisdom, on the other hand, consists in the passing of just judgments on the men and the things about which, in the affairs of life, we are called to decide. It is the offspring or companion of discernment, and discernment is nothing more than that prudent examination, previous to judgment, which leads to decide according to truth. The wise man, it is said, sees farther into futurity than other men, or excels in the faculty of anticipation; but this superiority is an evidence only of the accuracy of his judgment relative to things past. He supposes that future events, in similar circumstances, will resemble the past. His conceptions of the past are accurate, and he can scarcely err in his opinions of the future.

2. *If, after employing every precaution, you still find information incomplete, or ideas not sufficiently clear, suspend judgment till further investigation or greater experience shall qualify you to decide.*

I am aware that this rule may be supposed to be comprehended under the preceding; because, if we never judge with precipitation, we must, eventually, suspend that operation whenever the evidence is not satisfactory. But the prudent and rational conduct this rule inculcates is so momentous, both in science and in business, that it appeared to merit a separate enunciation and illustration.

A degree of skepticism, which presupposes a doubt of the truth of every proposition we have not examined, is requisite to every candid inquirer. But to many minds hesitation and suspense are uneasy feelings, and they are impatient to reach a determination. In many instances, if we proceed with propriety, we must observe the necessity of suspense of judgment, because our inquiries terminate in subjects beyond our comprehension. The cases, however, to which I would especially apply this rule, are those in which judgment comes within our comprehension; but we hesitate, either because ideas are not sufficiently distinct, or because we have not discovered the intermediate steps which show their relation. In such cases a candid inquirer must suspend judgment, because he can do nothing else. Should he go on, it is perfect accident if he reach a just determination.

When the mind is embarrassed and perplexed, it is often proper to relinquish the subject of inquiry for some time; and to resume it, after an interval of other employment. Its faculties return to the charge with new vigor, more experience, quicker discernment, and frequently with success. But the more common method

is, to pore upon the topic which engages attention, and instead of seeking for intermediate ideas, if it be a subject of argument, or further information, if it be a matter of fact, the inquirer retires to his closet, and forms theories which have no foundation either in reason or in truth. This spirit is fortunately banished, in a great measure, from the regions of philosophy, but it still remains in politics and in business.

A theoretical politician is exceedingly wise in conversation, but his speculations are rarely verified by experience. He proceeds on fallacious principles. He reasons on the supposition, that the motives and conduct of men are what they should be; or that men will act from steady principles of justice or interest. But the far greater part of their actions is the result of unaccountable attachment or passion, of fancy, feeling, whim, caprice. These can make no part of any theory, because they transcend all rules of calculation, and falsify every conclusion founded on reason and common sense. A man, therefore, who wishes to gain real influence in the world, will never rest resolutions on speculation. He will mix with mankind, and accommodate his opinions to characters and circumstances; and if these lead not to decision, he will patiently suspend judgment, and remain inactive; or he will act so ambiguously, that he may avail himself of better information when it shall occur.

Suspense of judgment, at least suspense in uttering judgments, if they contain any thing harsh, disagreeable, unpleasant, or even unpolite, is particularly necessary in all good company, and among all men of knowledge. Without this exercise of civility we cannot expect to be favored with the communications of superior information. We cannot render ourselves acceptable to those from whom we may derive the most essential benefits. We shall discompose and embarrass delicate society, we shall be exposed to critical reprehension, or involved in controversy, the bane of all good intercourse, and insuperable impediments in the acquisition of truth

Modesty in judgment is peculiarly graceful and promising in young inquirers. It is always interpreted in the most favorable sense; as a mark of ingenuousness, and a consciousness of the difficulty of attaining useful knowledge; dispositions which powerfully solicit liberal and enlightened minds to impart important aid. On the other hand, petulance, forwardness, and presumption, subject young inquirers to every disadvantage, and to many mortifications. They alarm men of superior parts and improvement, and render them averse to intimacy with persons from whom nothing is to be expected but irritation and disgust. They bring into suspicion the soundness of their understandings; so that these can hardly obtain the reputation of just judgment even when it is deserved.

3. *Be satisfied with the evidence which the nature of a proposition admits.*

To decide without evidence, is weakness and absurdity. To be satisfied with no evidence, is skepticism. To demand the same kind or degree of evidence for every proposition, is unnatural and unreasonable. The propositions of science, of arts, and of business, are supported by different kinds of evidence. No candid reasoner will demand the same species of evidence for them all. He is entitled to no other than the nature of each affords. Few subjects admit that complete conviction which excludes the possibility of doubt. The far greater part presents only higher or lower degrees of probability. Though in the sciences of quantity the mind proceeds on the firm ground of demonstration, it would be absurd to expect equal satisfaction in morals, politics, or natural history, because these sciences are incapable of such evidence.

Moral and political propositions are supported by evidence deduced from the human constitution, the order of nature, the hap-

piness of individuals, and of communities, which is far from being so conclusive and direct as to exclude hesitation, or even difference of opinion: yet these propositions involve truths very important to mankind. The rewards or punishments, assigned by their own minds, by the opinions of their fellow-creatures, and by the laws of society, depend upon them.

In natural history, which furnishes an account of animals, vegetables, and minerals: in geography, which supplies instruction concerning the surface of the earth, what parts are covered with land or water, where hills, valleys, capes, cities are situated, tides run, and winds blow: in civil history, which recounts the transactions, opinions, and manners of nations in former times: in the administration of justice and civil government, which applies the laws of the community to the actions of individuals, in order to protect the lives and property of the innocent, and to punish the guilty: in the relations we daily receive from foreign countries, concerning the public events of nations, or the industry, customs, and sentiments of individuals:—in all these cases we must depend upon the evidence of testimony; and if the information be not in its nature incredible, and we have no reason to question the veracity of the relater, we ought to be satisfied with that evidence.

Testimony is perhaps among the least satisfactory channels by which truth is conveyed to the mind. It is less satisfactory than those of intuition and reasoning, at least in the sciences of quantity. It is also inferior to those of consciousness and sensation; but it is, notwithstanding, of high importance to the comfort, peace, and happiness of society. No inconvenience results from following it with discretion. Were it rejected, every disorder and danger would ensue. Man is made to be satisfied with it. His situation often admits nothing more convincing. It was chiefly to vindicate the credibility of this species of evidence, to which inquirers sometimes will not allow the influence it deserves, that I advanced the rule under consideration; and it may not be improper to sketch the limits within which this evidence appears to be unexceptionable.

The first thing to be considered, then, is *the nature of the narration which solicits our belief;* because, if it be incredible, we need not go farther; we may reject the testimony without examination, because we are more certain that what is incredible cannot be true, than we can be certain of the truth of any testimony. A narration is incredible in two ways, either by containing an action in itself impracticable, or by containing circumstances contradictory to one another.

If, for instance, we were told, that an ordinary man bore a mountain on his back from Italy to France; or that there are men in the world who believe two and three make six; we would reject such relations as unworthy of the least credit, because they contain actions and opinions which contradict all our conceptions and experience of human powers and faculties. If, again, a relation represent the performer of an action in different places at the same time, we refuse credit, because it involves a contradiction, and supposes the coexistence of things which we know to be impossible. But if the action be practicable, if the agent be adequate to the performance, and if the account be intelligible and consistent, the next step is to examine the nature of the testimony; and if that also be unexceptionable, the mind is prepared to believe, and it will be impatient if not permitted to bestow assent.

The *circumstances of inquiry relative to the credibility of the testimony*, are, whether the relater was fully informed of the nature and particulars of the action; and whether he could be seduced by any temptation to misrepresent them.

The article of *full information* may be subdivided into several other inquiries; whether the action was an object of the senses of the relater; whether he had full time to examine it, and possessed the perfect use of his faculties at the time of examination; whether he examined the same action, or similar actions, at different times, and always formed similar judgments; and,

finally, whether this account is supported, at least not contradicted, by other accounts of credit.*

With regard to the *character of the relater*, we have reason to rely on his veracity, if we have no cause to doubt it; and if, at the same time, marks of sincerity, attention, or discernment appear, we cannot demand better foundation for assent. If an historian be exposed to no temptation to falsify or misrepresent, we suppose that he relates the truth; because it is much more easy to relate truth than to relate falsehood. Truth requires no anxious caution to preserve consistency, no struggle to repress the remonstrances of conscience, which even the most abandoned men cannot altogether silence. It follows the natural and consistent train of causes and effects. It presents a credibility and authority which command conviction.

But if, besides a general attachment to truth, we discover in an historian other symptoms of integrity, such as relating truth when it was his interest to conceal or misrepresent it, when it might hurt friends, gratify enemies, or expose himself to danger from the resentment of those whom it might offend; we have the best reason to credit his testimony; because he discovers not only great attachment to truth, but the strongest aversion to falsehood, and evinces, that the temptations which induce men of little virtue to disguise truth, and those of no virtue to suppress it, do not affect him. He is at

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[* Says Dr. Whately: "When the question is as to a fact, it is plain we have to look chiefly to the *honesty* of a witness, his accuracy, and his means of getting information. When the question is about a matter of opinion, it is equally plain that his *ability to form a judgment* is no less to be taken into account. But though this is admitted by all, it is very common with inconsiderate persons to overlook, in practice, the distinction, and to mistake as to *what it is* that, in each case, is attested."

For further excellent remarks on Testimony, consult Whately's Rhetoric, part i. chap. ii. § 4.]

least sincere, and his testimony must be believed, unless it can be proved that he was misinformed or mistaken.

If a narration be consistent, the only ground for charging its author with mistake or misinformation, is its contradiction of other accounts of credit, or its containing transactions of which we can explain neither the motives nor the manner. If two historians contradict one another, which seldom happens unless in cases of the most violent prevalence of party spirit, the evidence of both will be destroyed, or the small portion of credit that remains will operate in favor of the more respectable author. If one author omit what is related by another, the omission may excite suspicion, but forms no direct argument against the credibility; because many circumstances unknown to us might occasion the oversight of which we complain.

Neither is the containing of transactions, of which we cannot explain the motives or the manner, a good argument against the authenticity of a narrative; because the deficiency may be chargeable on the hearer or the reader, not on the relater. Men of all ages measure the motives, opinions, and actions of others, however different from themselves in constitution, or dissimilar in situation, by their own; and we need not be told that nothing can be more fallacious than such a standard. A remarkable passage of history may be produced to illustrate this observation.

Herodotus, in travelling to collect materials for his history of Greece, received intelligence that some Phœnician seamen had embarked on the Red Sea, sailed round the south coast of Africa, and returned home by the Columns of Hercules, or the Straits of Gibraltar. In which voyage they must have circumnavigated the Cape of Good Hope, commonly accounted one of the most brilliant discoveries of modern enterprise. The historian subjoins his own opinion; that the incident was incredible, because the voyagers reported that in some part of their navigations they had beheld the

ecliptic, or the line of motion of the sun, situated to the north of the zenith of their course. The historian, however, judged by a false standard; he condemned as incredible what he did not understand; because it was unknown, perhaps, in his time, that the appearance specified actually takes place, in the navigation he had related. He reprobates the account for a circumstance which is the most plausible characteristic of its authenticity; for it could hardly be supposed to have been conjectured unless it had been seen.

I have now offered every rule and observation which appeared of importance to be attended to in forming our judgments in science, arts, and business. I have unfolded the sources of those prejudices which obstruct the rectitude of our judgments; I have inculcated patience and attention in forming them when we have full information; I have enjoined suspense of judgment when information is wanting or deficient; I have recommended, finally, satisfaction with the best evidence that can be procured, and the propriety of judging and acting on that evidence. I know nothing more that can be done to render our judgments sound and logical, but that we carefully habituate ourselves to the practice of these rules. Without practice in this art, as in all others, performance will be awkward and imperfect; the rules will soon be forgotten, or will cease to have effect. They may become the subject of a little speculation, or conversation, perhaps; but will be of no service in the search of truth or in the conduct of life.

A man ignorant of all rule, but habituated to candid and diligent exercise of his faculties, will decide more expeditiously and accurately than one skilled in all the theory of reasoning without the practice. No theory of any art can make an expert practitioner. Logic pretends not to make mechanical reasoners. All it does, all it can do, is to show the way to find out truth,

and to guide the exertions of our faculties in the pursuit of it. But if inquirers will neither travel in the road that leads to the temple of truth, nor employ their faculties to discriminate her when they have reached her sacred residence; if they will not attempt to obtain an acquaintance and intimacy with her, her handmaid, logic, can furnish them no further service. She must leave them to that ignorance and insignificance to which they seem consigned by nature; and must solace herself by lending aid to candidates who will be more grateful for her favors, and improve them to better advantage.

PRINCIPLES AND RULES OF JUDGMENT

IN MATTERS OF REASON AND SPECULATION.

[Condensed from Watts' Logic, Part II., Chapter V.]

1. *Whatsoever is sufficiently clear and evident ought not to be denied, though there are other things belonging to the same subject which cannot be comprehended*

2. *If any opinion proposed has equal arguments for and against it, we must remain in perfect suspense about it till convincing evidence appear on one side.*

3. *Of two opinions, if one has unanswerable difficulties attending it, we must not reject it immediately*, but ascertain whether the contrary opinion has not difficulties as unanswerable.

4. *If each opinion has objections against it which we cannot answer or reconcile, we should rather embrace that which has the least difficulties in it*, and which has the best arguments to support it; and let our assent bear proportion to the superior evidence.

5. *If any doctrine has very strong and sufficient evidence to command our assent, we should not reject it*

because there are some objections urged against it which we may not be able to answer; for otherwise a common Christian would be baffled out of every article of his faith, and must renounce even the dictates of his reason and his senses.

6. *Where two extremes are proposed, either in matter of speculation or practice, and neither of them has convincing evidence, it is generally safest to take the middle way*, which is more likely to come near the truth than doubtful extremes.

7. *When two different propositions have each very strong evidence, and do not plainly appear inconsistent, we may believe both of them, though we cannot at present see the way to reconcile them.* Reason, as well as our own consciousness, assures us that the will of man is free, and that multitudes of human actions are in that respect contingent; and yet reason and scripture assure us that God foreknows them all, and this implies a certain fatality. Now, though learned men have not to this day hit on any so clear and happy method as is desired to reconcile these propositions, yet since we do not see a plain inconsistency in them we justly believe them both, because their evidence is great.

8. *Let us not, therefore, too suddenly determine in difficult matters, that two things are utterly inconsistent;* for there are many propositions which may appear inconsistent at first, and yet afterwards we find their consistency, and the way of reconciling them may be made plain and easy; as also there are other propositions which may appear consistent at first, but after due examination we find their inconsistency.

9. For the same reason *we should not call those difficulties utterly insoluble, or those objections unanswerable, which we are not presently able to answer.* Time and diligence may give more light.

10. *If we happen to have our chief arguments for any opinion refuted, we should not immediately give up the opinion itself;* for, perhaps, it may be a truth still, and we may find it to be supported by other arguments, which we might once think weaker, or perhaps by new arguments which we knew not before.

11. *We ought to esteem that to be sufficient evidence of a proposition where both the kind and the force of the arguments or proofs are as great as the nature of the thing admits, and as the necessity or exigence of the case requires.* So if we have a credible and certain testimony that Christ rose from the dead, we are not to expect mathematical or ocular demonstration for it, at least in our day.

12. Though we should seek what proofs may be attained of any proposition, and we should receive any number of arguments which are just and evident for the confirmation of the same truth, yet *we must not judge of the truth of any proposition by the number of arguments which are brought in support of it*, but by the strength and weight of them.

13. Yet *where certain evidence is not to be found or expected, a considerable number of probable arguments carry great weight* with them even in matters of speculation. That is a probable hypothesis in philosophy or theology, which goes farthest towards the solution of many difficult questions arising on any subject.

IN MATTERS OF MORALITY AND RELIGION.

By matters of morality and religion, are meant those things which relate to our duty to God, ourselves, or our fellow-men. The words *vice* and *virtue* chiefly imply the relation of our actions to men and this world: *sin*

and *holiness* rather imply their relation to God and the other world.

1. The will of our Maker, whether discovered by reason or revelation, carries the highest authority with it, and is therefore the highest rule of duty to intelligent creatures; a conformity or non-conformity to which, determines their actions to be morally good or evil.

2. Whatsoever is really an immediate duty towards ourselves, or towards our fellow-creatures, is more remotely a duty to God, and therefore in the practice of it we should have an eye to the will of God as our Rule, and to his glory as our End.

3. Our wise and gracious Creator has closely united our duty and our happiness together, and has connected sin or vice and punishment together, both in the nature of things and by his own positive appointment.

4. Conscience should seek all due information in order to determine what is duty and what is sin, because happiness and misery depend upon it.

5. On this account our inclination to present temporal good, and our aversion to present temporal evil, must be wisely overbalanced by the consideration of future and eternal good or evil; that is, happiness or misery: and for this reason we should not omit or commit a sin, to gain any temporal good or to avoid any temporal evil.

6. As there are some duties much more important than others are, so every duty requires our application to understand and practise it, in proportion to its importance.

7. Where two duties seem to stand in opposition to each other, and we cannot practise both, the less must give way to the greater, and the omission of the less is not sinful.

8. In actions where there may be some scruple about

the duty or lawfulness of them, we should choose always the safest side, and abstain as far as we can from the practice of things whose lawfulness we suspect.

9. In some of the outward practices and forms of religion, as well as human affairs, there is frequently a present necessity of speedy action in one way or another. In such a case, having surveyed the arguments on both sides, as far as time and circumstances admit, we must guide our practice by those reasons which seem at the time to overbalance the rest; yet always reserving room to admit further light and evidence when such occurrences return again. It is a preponderation of circumstantial arguments that must determine our actions in a thousand cases.

IN MATTERS OF HUMAN PRUDENCE.

1. Our regard to persons or things should be governed by the degrees of concernment we have with them, the relation we have to them, or the expectation we have from them.

2. We should always consider whether the thing we pursue be attainable; whether it be worthy of our pursuit; whether it be worthy of the means used in order to attain it.

3. Though a general knowledge of things be useful in science and in human life, yet we should content ourselves with a more superficial knowledge of those things which have the least relation to our chief end and design. We should not grasp at every thing, lest in the end we attain nothing.

4. Where the case and circumstances of wise and good men resemble our own case and circumstances, we may borrow a great deal of instruction towards our

present conduct from their example; as well as in all cases we may learn much from their conversation and advice.

IN MATTERS OF DIVINE TESTIMONY.

As human testimony acquaints us with matters of fact, both past and present, which lie beyond the reach of our own personal notice; so Divine testimony is suited to inform us both of the nature of things, as well as of matters of fact; and of things future, as well as of present or past.

Whatsoever is dictated to us by God himself, or by men who are divinely inspired, must be believed with full assurance. *Reason demands of us to believe whatsoever Divine revelation dictates;* for God is perfectly wise, and cannot be deceived; he is faithful and good, and will not deceive his creatures; and when reason has found out certain marks or credentials of Divine testimony to belong to any proposition, there remains then no further inquiry to be made, but only to find out the true sense and meaning of that which God has revealed; for reason itself demands the belief of it.

LECTURE VIII.

REASONING—MATHEMATICAL—MORAL—POLITICAL—PRUDENTIAL—PROBABLE REASONING.

I HAVE discussed every topic introductory to the art of reasoning. I have explained the sources from which ideas are received, and the methods we must employ to render them clear, adequate, and conclusive. I have explained the nature of the propositions into which they may be formed, and the judgments which we must pass on these propositions. I have, finally, delineated the prejudices which pervert our judgments; and I have attempted to establish the rules we must follow, if we expect to form them with accuracy and justice. It remains only, to complete this department of the course, that I treat of *reasoning*, or *the method of ascertaining propositions, by means of intermediate ideas, or proofs*, whether demonstrative or probable.

I formerly observed, that all knowledge is either intuitive, demonstrative, or probable. The first, intuitive knowledge, is so extremely circumscribed, that if man had no other method of comparing ideas, and extending information, though he might be wiser than the beasts of the field or the fowls of the air, yet he would be ignorant of all science and arts. All individuals and communities would be nearly in the same state of improvement. The only difference among them would result from their quickness or sagacity in perceiving self-evident propositions.

As it is, then, the exercise of his reasoning faculty by which man attains the most decisive eminence in the

creation, by which he ascends far above the inferior animals, and by which different men and different communities are conspicuously exalted one above another, in all those acquisitions which cultivate, civilize, adorn, and enlighten the mind of man, it is a matter of the most important concern to examine what sort of operation reasoning is, how we shall perform it with most expedition and success, and how we shall avoid those errors by which many reasoners in all ages have been led astray. To assist in this delicate and arduous undertaking, is the object of the discussion on which I am now to enter.

Reasoning begins where intuition ends, and consists in finding out the truth of a proposition, or the agreement or disagreement of its subject and predicate, by the help of intermediate ideas. The intermediate ideas form the steps, or links, by which the mind passes from the first of the primary ideas to the last, or from the subject of any proposition to its predicate, and finally perceives their relation. Reasoning assumes different names, according to the nature of the steps, or of the links which display the relation between the primary ideas. If the mind attain complete satisfaction in every step of its progress, or in the successive comparison of every pair of ideas, it is said to acquire certainty of the agreement or disagreement of the two primary ideas, and the reasoning is called *demonstrative*.

If the agreement of the intermediate ideas with one another and with the extremes is not perfectly satisfactory—that is, if the steps of the reasoning leave the mind under some degree of hesitation, the reasoning is denominated *probable*, and the reasoner attains probability only of the truth of the proposition he investigates. Where certainty terminates, probability commences; and the latter admits numerous degrees, from the high

est degree, which stands next to certainty, to the lowest, which makes so little impression as to permit the mind to remain in a state of suspense.

If a proposition, supported by probable evidence, relate to speculation, the judgment formed concerning it is often called *opinion;* if it relate to facts, chiefly supported by testimony, the judgment is generally called *belief.** In explaining, then, the branch of logic now

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[* *Belief, and degrees of belief.* In forming any judgment, we cannot avoid attaching to it a particular degree of credence, which might be, and often is, expressed by the insertion of some adverb to qualify the copula, thus: "To-morrow will (possibly) be fine;" and, "Two straight lines (indisputably) cannot inclose a space." Although one of these judgments admits a degree of doubt which the other excludes, the difference lies in our knowledge of the things spoken of, rather than in the things themselves.

The amount of belief which we have in our judgment has been called its modality, as being the *mode* in which we hold it for truth. Arranging the degrees of modality in an ascending scale, we find that a judgment may be—

1. Possible, where, upon the first view, we have no cause to think that the predicate may not be truly said of the subject, but have not examined. Does this amount to a judgment? or is it the step which must precede the formation of the weakest kind of judgment?

2. Doubtful, where we have tested it in some cases, and found that some seem to confirm it, whilst some are doubtful.

3. Probable, where all the trials we have made are favorable, but the number of them is not sufficient to warrant certainty.

4. Morally certain for the thinker himself, where, from examination of the matter, or prejudice, or interest, he has formed his own belief, but cannot put forward sufficient grounds for it, so as to control that of others.

5. Morally certain for a class or school, where the judgment rests on grounds which are sufficient for all men of the same habits of thought, or the same education as the thinker.

6. Morally certain for all; as, for example, the belief that there is a future state, which, though not absolutely demonstrable, rests upon such grounds that it ought to influence the conduct (*mores*) of every man.

7. Physically certain, with a limit, where the judgment is grounded on an induction supposed to be complete, but with the possibility that future induction may supersede it.

8. Physically certain, without limitation; as our belief in the law of gravitation, the law of chemical affinity, &c.

9. Mathematically certain, where doubt cannot be admitted. *Ex. gr.*, the axiom—"Two straight lines cannot inclose a space;" or the theorem, "The angles at the base of an isosceles triangle are equal."

before us, all we have to do is to discuss, *first, the nature of demonstrative reasoning; secondly, that of probable reasoning;* and *to point out the sciences and arts in which they are respectively employed.* All reasoning is either of the one kind or the other; and in every science or art in which conviction reaches not certainty, we must be content with probability. After I have finished the explanation of legitimate reasoning, I shall investigate the nature of sophistry, and point out the chief methods by which mankind in all ages have imposed on themselves, or misled others. I shall conclude the course with an account of the syllogism of Aristotle, and a discussion of its merit as a mode of reasoning.*

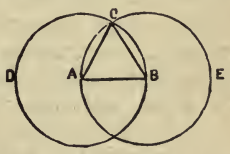
Mathematics and arithmetic, I must again remark, are *the only sciences susceptible of demonstrative proof*, which is so satisfactory and cogent as to exclude even the supposition of falsehood. Other sciences in their principles may perhaps furnish proofs nearly, if not completely demonstrative; but in the detail they exhibit nothing better than probability. The high evidence of the sciences of quantity, independent of the importance of the truths they teach, renders them a good exemplification of the rules of logic; and one of the best methods of becoming a good reasoner, is to be familiar with the processes of investigation they supply.

All these degrees of belief may, upon a broader principle of division, be resolved into three. Our judgments, according to Aristotle, are either problematical, assertive, or demonstrable—the results of opinion, of belief, or of science.—*Thomson's Laws of Thought*, § 120.]

[* The word reasoning is ambiguous. In one of its acceptations, it means syllogism, or the mode of inference which may be called concluding from generals to particulars. In another of its senses, to reason, is simply to infer any assertion from assertions already admitted, and in this sense induction is as much entitled to be called reasoning as the demonstrations of geometry.—*Mill's Logic.*]

To illustrate *the nature of demonstrative reasoning*, I shall analyze some propositions of the Elements of Euclid. Reasoning is a successive comparison of every pair of ideas, from the first to the last, or from the idea which forms the subject of the proposition, to the one which forms the predicate; and in demonstration every comparison is intuitively certain. When these ideas are found to agree, the demonstration is finished, and the reasoning is concluded. I begin with the first proposition of the first book of the Elements, which proposes, "To describe an equilateral triangle on a given straight line." I pass over the operations by which the triangle in the figure is described, because I mean to analyze only the reasoning of the proposition.

After the figure is constructed on the given line, the proposition to be proved is, that "the triangle so constructed is equilateral, or has all its sides equal." The subject of the proposition, or the first idea of it, is that of the triangle described; the predicate of the proposition, or the second idea of it, is that of the equality of the sides of the triangle. Now, it is not intuitively certain that the three sides are all equal to one another; therefore some intermediate ideas must be placed between the subject and the predicate of the proposition, to show their agreement. The process consists of two steps, or one intermediate idea is necessary to prove the proposition. The first step is the comparison of the base A B with one of the sides A C; and of their equality we have intuitive certainty, because, by the description of the figure, they are semi-diameters, or radii of the same circle.

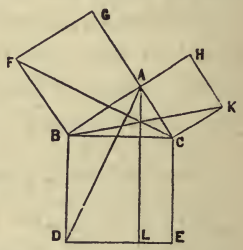


The second step is the comparison of the same side or base A B with the other side B C; and of their equality, also, we have intuitive certainty, as they are both semi-diameters of another circle. This step finishes the demonstration. The base is found to agree with both the sides; and the triangle must be equilateral, because all the sides are equal. The subject and predicate of the proposition are found exactly to agree.

In the famous forty-seventh proposition of the first book of the

Elements, the truth to be established is, "That in a right-angled triangle, the square of the side opposite to the right angle is equal in quantity to the sum of the squares of the other sides." The square opposite to the right angle is the subject, the sum of the two other squares is the predicate, and the idea of the extent of the first square is to be compared with the idea of the sum of the other two squares. The process is long and beautiful, and I shall point out the different steps.

The first step is to prove that G A C is one straight line, and H A B another, in order to lay a foundation for demonstrating that the triangle F B C is equal to half the square F A, and the triangle A B D equal to half the parallelogram B L. The next step is to prove the triangle A B D equal to the triangle F B C. The third step is to prove the triangle A B D equal to half the parallelogram B L, and the triangle F B C equal to half the square F A; and hence to infer the equality of the square F A to the parallelogram B L. Three similar steps are necessary to find the square A K equal to the parallelogram C L; and hence to infer the equality of the whole square B E to the two squares F A and A K, which establishes the agreement of the subject and predicate of the proposition; or that the square of the side opposite to the right angle, is equal to the squares of the two other sides. To complete this process, then, there are necessary these six capital steps, and each of these includes one or more subordinate steps, so that the sum of the subordinate steps amounts to no fewer than twelve; and if these are added to the six capital ones, it appears, that to prove this proposition, there are requisite eighteen intermediate ideas. The mind has a clear and distinct perception of the agreement of every pair of ideas; and as the effect is proportional to the cause, it obtains the most complete certainty of the truth of the proposition.*



All reasoning has this in common with demonstration, that the agreement or disagreement of the primary ideas must be proved by intermediate ideas; *the differ-*

[* Dr. Abercrombie furnishes some admirable remarks upon mathematical reasoning, pp. 202–4, *Intell. Powers.*]

ence is, that the agreement of the intermediate ideas with one another, and with their primary ideas, amounts not to certainty; it is no more than probable.*

From this view it will appear, that *the far greater part of knowledge, and even the most interesting and important part*, that which concerns morality, politics, the useful arts, and business, *is not supported by better evidence than probability.* The probability, however, in many cases is highly convincing, approaches very near to certainty, and affords good ground for acting upon it with perfect confidence and satisfaction. It has often been wished, and sometimes asserted, that morality particularly might be fortified with the evidence of certainty; but there is much reason to apprehend that the undertaking would be unsuccessful. The duties mankind owe to the Author of nature, to their fellow-creatures, and to themselves, though palpable and obvious in their principles, yet when pursued through the ramifications in which they unfold themselves, they deviate into relations where the agreement of ideas is neither clear nor adequate.

That all men should revere their Maker, and should perform every duty they conceive will be acceptable to him; that they should do good to their fellow-creatures, and should not wantonly hurt or injure them; that they should live in temperance and moderation, in order to insure the highest happiness their constitutions can enjoy; are all conclusions, of the justness of which nobody can doubt, any more, perhaps, than they can doubt that two and three make five, or that the three angles of a triangle are equal to two right angles. The agreement of the idea we have of man, with those [which we have] of his Creator, and our fellow-creature, infers these duties with an evidence which approaches very near, if it do not reach, demonstration. But when we descend to investigate the

[* At the close of the lecture will be added, from the pen of the late Dr. George Payne, an admirable view of the nature of Probable Reasoning, which should be carefully studied and mastered.]

nature of particular acts of regard to God, or of intercourse with our fellow-creatures; our scale applies not accurately, the agreement or disagreement of ideas is not perfectly clear; and we are not certain, at least we do not agree, where regard to the Almighty terminates, and disregard begins; where justice or charity ceases, and injustice or severity commences. Till this can be done, we have no reason to expect that the precepts of morality shall be supported by the evidence of demonstration.

The same species of reasoning applies to the evidence of other sciences, of arts, and of business. In them all the mind discovers only *moral certainty*, that is, different degrees of probable evidence, according as the agreement of ideas is more or less clear and satisfactory. To illustrate these observations, I shall produce a few *examples*. Suppose some reasoning were employed to recommend the love of God, or to prove this proposition, that man ought to love God. The agreement of ideas in moral reasoning, I have formerly observed, relates to propriety, fitness, reasonableness. The proposition, then, involves the question whether the idea we have of such an imperfect, dependent creature as man, agrees with the idea of his exerting love towards the great, wise, and good Being who made the universe, or whether it be fit, proper, and right that man should love God?

To prove this proposition, I might employ several *intermediate ideas;* I might *first* show that the Almighty is the most amiable Being in the universe, and that he possesses all those attributes of goodness, wisdom, and power, most calculated to excite attachment. The amiableness of God would thus involve a large collection of particulars, or subordinate ideas, which altogether would constitute what, in the science of morals, is denominated an argument. I might prove, *secondly*, that the love of God is the surest means of happiness to ourselves. It will communicate self-approbation, confidence in the wisdom of Providence and the administration of human affairs; and will extirpate those anxieties and fears which haunt and distract weak and vicious men. The illustration of these

topics, also, would include a great number of subordinate ideas, and would constitute another argument for the love of God. I might *further* insist that love to God is reasonable and proper, in return for the numerous instances of kindness, mercy, and love, he daily exerts towards us. The illustration of these instances, likewise, would comprehend many subordinate ideas, and would furnish a third argument in support of the proposition.

Suppose, again, it were to be inferred from future punishment that men must be free agents, or that the idea of future punishment agrees with that of self-determination, or the freedom of action. The following train of intermediate ideas will show that agreement.

Future punishment must be inflicted by the Almighty; the Almighty can inflict no punishment not just; the punished, of course, must be guilty; they could, then, have done otherwise, and consequently must be free agents. This train of ideas, more shortly expressed, will stand thus: Future punishment—God the punisher—punishment just—punished guilty—could have done otherwise—self-determination. In this piece of reasoning there are four intermediate ideas, and five comparisons are made to discover the agreement with the extremes, and with one another. The agreement between the adjacent ideas in every movement, appears with a high degree of conviction; and were each of the ideas illustrated at some length, according to the common mode of reasoning on moral topics, the whole would form an elegant deduction, and would communicate a very vivid impression.

Let us suppose, further, the following political proposition were proposed to be proved; and let us consider the nature of the reasoning requisite to establish it: "Industry is the capital source of national prosperity." The ideas, or terms, as the logicians express themselves, to be compared, are those of industry and national prosperity. I must also remark, that agreement of ideas in politics refers, not to reasonableness and fitness, as in morals, but to public utility, or national happiness. The meaning, then, of the proposition will be, that industry makes a nation prosperous, by extending

its opulence and exalting its reputation, in support of which I may argue in the following train:

Industry increases the population of a country, by providing subsistence for additional inhabitants. An increase of inhabitants increases commerce and manufactures. Commerce and manufactures procure riches from foreign nations of less industry. These riches prompt a spirit of enterprise still further to extend commerce and manufactures. Hence new nerves to domestic industry. The comforts, and many of the luxuries of life, are provided for all the members of the community. Ample security is found for the continuance of these advantages by the national reputation they procure, and the large resources of money and men they supply to maintain it. But national prosperity consists in these things which I have enumerated;—a wealthy, sober, industrious, and numerous people, respectable at home, and formidable abroad. Each of the steps might have been illustrated at considerable length, and might have formed a very pleasant and satisfactory discussion. They may also be condensed into more narrow bounds, and may form the following series ready for the nearest comparison. National industry—increase of people—improvements in commerce and manufactures—national riches—national enterprise—people at home, numerous and happy, respectable and formidable abroad—national prosperity. This series presents five intermediate ideas; and six comparisons are requisite to afford conviction of the agreement of the first idea with the last, or of the subject of the proposition with its predicate.

In the specimens I have advanced from morals and politics, the evidence, you will observe, though highly satisfactory, is still no more than probable; and appears not with that commanding tone which compels assent. Skeptical men may find reason to suspend assent, and disputatious men may raise difficulties, which we are obliged to admit are not destitute of foundation. Accordingly, against every step of the preceding political series, some cause of hesitation may be started.

It may be urged, that industry is not always attended with an increase of people; it may even sometimes produce the contrary effect; it may induce the people to emigrate to other countries,

where their labor will be better rewarded than at home. It may be urged again, that the most warlike and powerful nations are often the poorest and most hardy, while arts and industry only supply riches to tempt such adventurers to seize both the country and its wealth. It may be contended, that arts and industry enervate mankind, multiply wants and vices, and render people miserable in the midst of every provision for happiness; that they repress all the great and splendid, and consequently many of the most pleasant exertions of the mind. It is the possibility of constructions of this sort, in all probable investigations, which diminishes their evidence, and renders the conviction they produce inferior to that of demonstration.

But, however susceptible of controversy these specimens of reasoning may be, they are much more satisfactory than many of the conjectural opinions on which men must every day act in some of the most important concerns of life. Many of the engagements we form, every new line of life on which we enter, involve numerous considerations to determine our conduct, which are scarcely supported by better evidence than speculation. The wisdom of the most prudent man is frequently not more meritorious than the sagacity which leads him to conjecture with most probability, or which teaches him to proceed with recollection and attention to surrounding objects, so as to avail himself of events as they occur.

I mention these particulars to evince, that we have no good reason to be dissatisfied with our condition, though we should not receive, on many subjects of knowledge, other evidence for truth than that of probability. It is sufficient to guide us to happiness, while uncertainty about futurity in particular is, perhaps, one of the most merciful dispensations with which the providence of heaven could have favored mankind. The highest happiness we can partake in this world, is extremely circumscribed. One of the chief ingredi-

ents of our enjoyments is hope; and were our anticipations and conjectures about futurity less equivocal, our hopes would be correspondently diminished. In our deepest distress, our ignorance of what is to come is so great as never to preclude hope. We sometimes experience relief, contrary to every view of probability, and every expectation; and we have always the consolation of looking forward, and hoping for better days.

In our reasonings of anticipation, we proceed chiefly by *analogy*. We suppose that the future will resemble the past. In the negotiations of business, and in forecasting the probable consequences of any plan of conduct, we must conclude, that similar causes will produce similar effects; that men will act in time to come as they have done in time past; and that the course of nature will proceed by the established rules which have directed it since the world began. We argue from the characters, the opinions, the interests, the passions, the weaknesses, and the caprices of men; and we endeavor to form systems of conduct for them, derived from the situations which they occupy. The trains of reasoning we adopt in such cases, are in a great measure hypothetical; and the probability of the evidence frequently is of the lowest kind. Conjectures often so counterbalance one another, as to leave the mind in a state of total suspense.

OBSERVATIONS ON PROBABLE REASONING.

[From Dr. George Payne's Mental Science.]

[According to Dr. Thomas Brown, reasoning, as expressed in words, consists of a series of propositions, each of which embodies and expresses a feeling of the relation of comprehension. "Man is an intellectual being; he should not, therefore, pursue the gratifica-

tions of sense only." The preceding sentence contains two distinct propositions; and the whole is an effect of what is called reasoning. Each of these propositions expresses nothing more than a recognized relation—the relation of comprehension. The first one exhibits something which forms a part of our complex notion of man, viz., intellect; the second, something which enters into our complex notion of an intellectual being, viz., elevation above the pleasure of mere appetites. "In a single proposition," says Dr. Brown, "we take one step, or feel one relation; in an enthymeme we take two steps, or feel two relations; in a syllogism we take three steps, or feel three relations: whatever is affirmed in any stage of our reasonings, is a relation of some sort,—of which, as felt by us, the proposition that affirms the relation is only a verbal statement."

All reasoning, then, verbally expressed, consists of a series of propositions: but every series of propositions does not constitute reasoning. "God is infinitely wise," "Man is prone to err," "Heaven is the abode of happiness." Here is a series of propositions, each of them embodying a judgment, or the notion of a relation; but there is no ratiocination here. To constitute reasoning, there must be a certain connection in the propositions enunciated, by which the last is connected as effectually as the second with the first.

What, then, is the *nature of this connection* of the propositions in a process of reasoning? This will, perhaps, be best ascertained by examining a particular instance, viz., "Man is possessed of intellect, will, freedom, &c.; he is, therefore, a capable subject of moral government." In this example, the term *man* is what is called the subject of the first proposition; and his affirmed capability of moral government is denominated its predicate. It will be observed, however, that

this predicate becomes the subject of the second proposition, which, when fully expressed, stands as follows: A being possessed of intellect, will, &c., is a capable subject of moral government. We are accordingly led by this particular instance to the general doctrine that, to confer upon a series of propositions a claim to the character of reasoning, it is essential that the predicate of each of the propositions constitute the subject of the proposition which immediately follows it; in that case the predicate of the last will be as certainly connected with the subject of the first proposition, as though they stood in juxtaposition. By lengthening the preceding series of propositions, the truth and importance of this statement will be rendered apparent.

Man is possessed of intellect, will, freedom, &c.

The possessor of intellect, &c., is a capable subject of moral government.

A capable subject, &c., &c., may expect that his conduct will hereafter undergo the scrutiny of the Judge of all.

In the above series, it will be seen that the predicate of the first becomes the subject of the second proposition,—and the predicate of the second, the subject of the third; and further, that the subject *man* of the first is connected with the predicate of the last: thus, Man may expect that his conduct will hereafter undergo, &c.

The reason of this connection will be apparent, when it is remembered that each of the predicates declares what is comprehended in the complex notion expressed by its subject. The possession of intellect, will, &c., is involved in our complex notion of man; capacity of moral government is involved in our complex notion of a being possessing intellect, &c., &c.; and the certainty of the scrutiny referred to is involved in our complex notion of a capable subject of moral government. Now,

if the second is involved in the first—the third in the second—and the fourth in the third—it is manifest that the fourth is as really involved in the first as in the third. And thus it is in every train of reasoning, however long that train may be. An analysis takes place in our mind, of the complex notion denoted by the first, or original subject, in consequence of which we are enabled to predicate something of it. That which is thus predicated undergoes a similar process of analysis, the result of which is embodied in the subsequent proposition; so that when we arrive at the conclusion, how distant soever it may be, the last predicate is as truly contained in the first as is its particular predicate, though it does not become visible to us till exhibited, as it were, in its elementary state, by the repetition of analysis after analysis.]

LECTURE IX.

DIFFERENT PROCESSES OF REASONING—EXAMINATION OF THE VALIDITY OF A PROCESS OF REASONING—DIFFERENT KINDS OF SOPHISTRY—THE VARIOUS USE AND ORDER OF SEVERAL KINDS OF PROPOSITIONS AND OF ARGUMENTS—THE EXERCISE OF A SOUND JUDGMENT.

In the preceding lecture I explained the nature of reasoning, and the different degrees of evidence it conveys to the mind, according as it is demonstrative or probable. I have shown that it consists in perceiving whether ideas agree or disagree; and I have illustrated the meaning of this agreement in mathematics, morals, politics, and business. It only remains, that I explain

the different methods, in common use, of distributing or arranging ideas in different processes of reasoning.

In this view, *reasoning* is said to be either *direct* or *indirect.* In direct reasoning, we prove a proposition in the manner I have explained, by finding intermediate ideas that show the agreement of the terms of which it consists. In indirect reasoning, we do not trace the agreement of the terms of a proposition; it takes place only when the predicate of a proposition admits an alternative, and when either the predicate or the alternative must be true, or must agree with the subject of the proposition, because they exhaust every case that can exist. We prove that the alternative cannot be true, and therefore the predicate must be true. An example will make this matter perfectly clear.

Euclid lays down this proposition—"That a straight line drawn at right angles from the extremity of a diameter, falls without the circle." No intermediate idea, it seems, occurred, by which he could deduce the proof directly from the nature of the circle, or of the perpendicular or the extremity of the diameter. He proceeds, therefore, by indirect demonstration, and introduces an alternative. The perpendicular must fall either without the circle, or within it. No third supposition can be made relative to the manner of its falling, for it cannot fall upon the circumference of the circle, except in one point. He proves that the alternative cannot be true, or that the perpendicular cannot fall within the circle. The predicate, then, must be true, that the perpendicular falls without the circle.

Again—"The moon is either an opaque or a transparent body." It is not transparent, because, if it were, it would transmit the rays of the sun when it comes between the sun and the earth; and no eclipse of the sun could happen from the intervention of it between the sun and the earth; but this conclusion is contrary to truth, for such eclipse does happen. The alternative, therefore, that the moon is a transparent body must be false, and consequently the predicate must be true, than the moon is an opaque body. The refutation of the alternative is always pursued till it terminates in

some contradiction, falsehood, or absurdity; and on this account indirect reasoning is sometimes called "*reductio ad absurdum*" by the logicians.

It has often been disputed, whether indirect reasoning is less elegant and satisfactory than direct; but I need not spend time in remarks on this controversy. Both convey truth with perfect evidence; and when a reasoner has got possession of an indirect proof, he will not, I believe, trouble himself much in searching for a direct one. It is, however, generally supposed, that mathematicians never employ the former but in cases of necessity, when they cannot have recourse to the latter. The great number of beautiful specimens of demonstration of which their science is susceptible, may render them nice or delicate even about the elegance and manner of their reasonings; but on other subjects, and in other sciences, when the mind is glad to reach important truth on any terms, it will be abundantly satisfied with good indirect proof. It may, perhaps, be doubted whether the charge of inelegance is not the offspring of squeamishness and caprice, rather than of just taste. An indirect train of ideas is often long, and is conjoined with as much clearness and propriety as any direct one. The step from the falsehood of the alternative to the truth of the predicate, is perfectly satisfactory, if not elegant; and it may be added, that indirect reasoning imparts variety to the nature of the proof.*

[* Dr. Watts thus describes some arguments of an *indirect* form: (1.) When some contradictory proposition is proved to be false, improbable, or impossible; or when, upon supposition of the falsehood, or denial of the original proposition, some absurdity is inferred. This is called a proof *per impossibile*, or a *reductio ad absurdum*. (2.) When some other proposition is proved to be true, which is less probable; and thence it follows that the original proposition is true, because it is more probable. (3.) When any other proposition is proved, upon which it was before agreed to yield the original question.]

Reasoning, further, is said to proceed either *a priori*, or *a posteriori*—a distinction which relates entirely to cause and effect. In reasoning *a priori*, we begin with the cause, and infer from it the reality or the species of the effect. In reasoning *a posteriori*, we reverse this process; we begin with the effect, and reason backward from it, to the establishment of the existence and qualities of the cause.

If, for *example*, I maintain, that the soul of man is a thinking substance, and therefore that it is immaterial, because matter cannot think; and hence again infer that it is immortal, because what is immaterial cannot die or be destroyed—I reason *a priori;* I deduce the effect from its cause, and prove the soul to be immortal from the nature of its constitution. If, again, I argue that the people who live fifteen degrees further east than we will have their day beginning and ending an hour sooner than ours; that navigators, of course, who have sailed fifteen degrees eastward will have lost an hour of our day, and will have gained an hour from the day of the people of that longitude; that these navigators will experience a similar loss and gain in point of time, for every fifteen degrees eastward on the face of the globe; and that, as they must pass through four and twenty times fifteen degrees in sailing round the globe, so, on returning home, they will calculate time a day sooner than their countrymen, because they have lost twenty-four hours of the time of their countrymen in their voyage: in this process I reason *a priori*, because I deduce a curious fact, verified by experience, from the figure of the earth, round which the navigation is performed.

In reasoning *a posteriori*, we argue from the effect to the cause, and conclude from the former the nature or existence of the latter.

For *example*, from the wisdom, power, and goodness discernible in all the works of nature, I infer that there must be some wise, benevolent, and omnipotent cause, from which these effects proceed. I cannot doubt of the effects, because I experience them every moment of my existence; I can as little doubt that they must proceed from some cause, and that the cause must possess the qualities conspicuous in the effects. I observe, again, that the shadow of

the earth projected on the face of the moon, in a lunar eclipse, is of a circular form; and from this effect I justly infer that the figure of the earth is round, because this figure only could produce such a shadow.

Reasonings *a priori* are much circumscribed, because causes are seldom so well known as their effects. From effects, chiefly, we ascend to the knowledge of causes and on this account, reasoning *a posteriori* is much more frequent. It is much employed in inquiries into nature; it is the groundwork of the famous method of induction for investigating natural knowledge, recommended in the "Novum Organum" of Lord Bacon; and it is of frequent use in politics and morals.

The best way to obtain an acquaintance, both with the Author of nature, and with the secondary causes which produce the effects we daily behold, is to survey with patience the effects themselves, because we have no means of information concerning the causes, except in this channel. In like manner, to understand the duties a man owes to his country, or to his neighbor, we must scrutinize his constitution, what forms the happiness of such a being, both as a member of society and a moral agent; what are his mental faculties and his bodily powers, his attachments and antipathies, his gratifications and his wants. In all these inquiries we begin from the effect, and ascend to the cause, or we reason *a posteriori*.

[We will now leave our author for a while, and draw upon Dr. Whately:

He distributes *arguments with respect to their subject-matter*, *into two great classes, viz.: First*, such arguments as might have been employed—not *as* arguments, but—to *account for* the fact or principle maintained, supposing its truth granted. *Secondly*, such as could *not* be so employed. The former class (the *a priori*) is manifestly argument from *cause* to effect, since to *account* for any thing signifies to assign the cause of it; this is the popular sense.

As far, then, as any cause, popularly speaking, has

a tendency to produce a certain effect, so far its existence is an argument for that effect. If the cause be fully *sufficient*, and no *impediments* intervene, the effect in question follows certainly; and the nearer we approach to this, the stronger the argument. This is the kind of argument which produces (when short of absolute certainty) that species of the probable which is usually called the "plausible."

The second class of arguments (referred to above) are designated by the terms "sign" and "example." The former is an argument from an *effect* to a *condition;*— a species of argument of which the analysis is as follows: As far as any circumstance is what may be called a *condition* of the existence of a certain effect or phenomenon, so far it may be inferred from the existence of that effect: if it be a condition *absolutely essential*, the argument is, of course, demonstrative; and the probability is the stronger in proportion as we approach to that case.

As an instance, a man is suspected as the perpetrator of a murder, from the circumstance of his clothes being bloody; the murder being considered as in a certain degree a probable *condition* of that appearance; i. e., it is presumed that his clothes would *not otherwise* have been bloody. Again, from the appearance of ice, we infer, decidedly, the existence of a temperature not above the freezing-point, that temperature being an essential condition of the crystallization of water.

Among the circumstances which are conditional to any effect, must evidently come the cause or causes; and if there be only one possible cause, this being absolutely essential, may be demonstratively proved from the effect: if the same effect might result from other causes, then the argument is, at best, but probable. But it is to be observed, that there are also many circum

stances which have no tendency to *produce* a certain effect, though it cannot exist *without* them, and from which effect, consequently, they may be inferred as conditions, though not causes: e. g., a man's being "alive one day," is a circumstance necessary, as a condition, to his "dying the next," but has no tendency to produce it; his having been alive, therefore, on the former day, may be proved from his subsequent death, but not *vice versa.*

It is to be observed, therefore, that though it is very common for the cause to be proved from its effect, it is never so proved, *so far forth as* it is a *cause*, but so far forth as it is a *condition*, or necessary circumstance.

A cause, again, may be employed to prove an effect (this being the *first* class of arguments), so far as it *has a tendency* to produce the effect, even though it be not at all *necessary* to it (i. e., when other causes may produce the same effect); and in this case, though an effect may be inferred from the cause, the cause cannot be inferred from the effect: e. g., from a mortal wound you may infer death, but not *vice versa.*

Lastly, when a cause is also a necessary or probable *condition*, i. e., when it is the *only* possible or only likely cause, then we may argue both ways: e. g., we may infer a general's success from his known skill, or his skill from his known success (in this, as in all cases, assuming what is the *better known* as a proof of what is less known, denied, or doubted): these two arguments belonging, respectively, to the two classes originally laid down.

The phrase "*a priori*" argument, is generally understood to extend to any argument drawn from an *antecedent* or a *forerunner*, whether a *cause* or not; e. g., "the mercury sinks, therefore it will rain." Now this argument being drawn from a circumstance which, though

an antecedent, is not a cause, would fall not under the former but under the latter of the classes laid down; since when rain comes, no one would *account* for the phenomenon by the falling of the mercury, which they would call a "*sign*" of rain; and yet most, perhaps, would class this among "a priori" arguments. In like manner, the expression, "a posteriori" arguments, would not in its ordinary use coincide precisely, though it would very nearly, with the second class of arguments.

Many writers, in investigating the cause to which any fact or phenomenon is to be attributed, have assigned that which is not a *cause*, but only a *proof* that the fact is so; and have thus been led into an endless train of errors and perplexities.

The word *why*, as an interrogative, is employed in three senses, viz., "By what proof?" (or reason). "From what cause?" "For what purpose?" This last is commonly called the "final cause:" e. g., "Why is this prisoner guilty of the crime?" "Why does a stone fall to the earth?" "Why did you go to London?" Much confusion has arisen from not distinguishing these different inquiries.

Ambiguity has arisen from the same words having come to be applied, in common, to diverse kinds of sequence; e. g., an effect is said to "follow" from a cause, and a conclusion to "follow" from the premises; the words "cause" and "reason" are each applied indifferently, both to a cause properly so called, and to the premise of an argument, though "reason," in strictness of speaking, should be confined to the latter. "Therefore," "hence," "consequently," &c., and also "since," "because," and "why," have likewise a corresponding ambiguity.

As before remarked, "reason" is employed to signify the premise, or premises of an argument: especially

the minor premise; and it is from "reason" in this sense that the word "reasoning" is derived. It is also very frequently used to signify a *cause;* as when we say, in popular language, that the "reason of an eclipse of the sun is, that the moon is interposed between it and the earth." This should be strictly called the *cause.* On the other hand, "because" (i. e., "by cause") is used to introduce either the physical cause or the logical proof; and "therefore," "hence," "since," "follow," "consequence," and many other kindred words, have a corresponding ambiguity: e. g., "the ground is wet, *because* it has rained;" or, "it has rained, and hence the ground is wet:" this is the assignment of the *cause.* Again, "it has rained *because* the ground is wet;" "the ground is wet, and *therefore* it has rained;" this is assigning the logical *proof:* the wetness of the ground is the cause, not of the rain having fallen, but of *our knowing* that it has fallen. And this probably it is that has led to the ambiguous use in all languages of almost all the words relating to these two points.

Next may be considered the *argument from Progressive Approach.* In this species, the force of the series of arguments results from the *order* in which they are considered, and from their *progressive* tendency to establish a certain conclusion.

For example: One part of the law of nature, called the *vis inertiæ*, is established by the argument alluded to; viz., that a body set in motion will eternally continue in motion, with uniform velocity, in a right line, so far as it is not acted upon by any causes which retard or stop, accelerate or divert its course. Now, as in every case which can come under our observation, some such causes do intervene, the assumed supposition is practically impossible, and we have no opportunity of

verifying the law by direct experiment; but we may *gradually approach* indefinitely near to the case supposed, and on the result of such experiments our conclusion is founded. We find that where a body is projected along a rough surface, its motion is speedily retarded and soon stopped; if along a smoother surface, it continues longer in motion; if upon ice, longer still; and the like with regard to wheels, &c., in proportion as we gradually lessen the friction of the machinery: and if we remove the resistance of the air, by setting a wheel or a pendulum in motion under an exhausted receiver, the motion is still longer continued. Finding, then, that the effect of the original impulse is more and more protracted, in proportion as we more and more remove the impediments to motion from friction and the resistance of the air, we reasonably conclude, that if this could be *completely* done (which is out of our power), the motion would never cease, since what appear to be the only causes of its cessation would be absent.

Dr. Whately adds a similar progressive argument for the being and attributes of God, and for religious toleration.—*Rhetoric*, part i. chap. ii. § 6.

In the next place, under the head of EXAMPLE,* Dr.

[* The EXAMPLE is an argument which proves something to be true in a particular case from another particular case. Thus, "Harvey might expect to be persecuted for his discovery of the circulation of the blood, because Galileo was for *his* discovery." But the connection between two distinct facts can only depend upon their coming under some common law, and therefore in the Example the proof is not of one particular judgment by another, but of a particular by means of a universal, for which another particular is the sign. Thus:

Galileo was persecuted—
Galileo was a discoverer in science;
Therefore *all* discoverers are likely to be persecuted.
Harvey is a discoverer,
Therefore he too will be persecuted.

This argument is called "rhetorical induction;" it differs from induction.

Whately comprehends the arguments designated by the various names of *induction*, *experience*, *analogy*, *parity of reasoning*, &c., all of which are essentially the same as to fundamental principles: for, in all the arguments designated by these names, it will be found, that we consider one or more known individual objects or instances of a certain class as a fair *sample*, in respect of some point or other of that class; and, consequently, draw an inference from them respecting either the whole class, or other less known individuals of it.

We do not, strictly speaking, reason *by* induction, but reason *from* induction, i. e., *from* our observations on one, or on several individuals, we draw a conclusion respecting the class they come under; or, in like manner, from several species, to the genus which comprehends them: e. g., "The earth moves round the sun in an elliptical orbit; so does Mercury, and Venus, and Mars, &c.; therefore a *planet* (the common term comprehending these singulars) moves round," &c. "Philip was reckless of human life; so was Alexander; so was Cæsar, &c.; therefore this is the general character of a *conqueror*."

In such arguments it is assumed, that *what belongs to the individual, or individuals we have examined, belongs* (certainly or probably, as the case may be), *to the whole class under which they come.*

With respect to the argument from *experience;*

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proper in bringing in only one example instead of many, and in going on to prove another particular case, instead of stopping at the general law. This difference disappears, if, with Diogenes, Laertius, and Cicero, we describe induction as an argument from particulars to like particulars.

The plan in this kind of argument is obvious; but the nearer the predicate of the second premise approaches to distribution (the introduction of the whole of their subject), the less probable is an error. If it could be shown that "Galileo was a fair sample of *all* discoverers," the mode would be formally correct. But in its weaker form it is perpetually employed — *Thomson.*]

strictly speaking, we know *by* experience only the *past* and what has occurred under our own observation; thus, we know by *experience* that the tides *have* daily ebbed and flowed during such a time, and from the testimony of others, as to their own experience, that the tides have formerly done so; and *from* this experience we conclude, *by* induction, that the same phenomenon will continue.

The word *analogy*, again, is generally employed in the case of arguments in which the instance adduced is somewhat more remote from that to which it is applied; e. g., a physician would be said to know by *experience* the noxious effects of a certain drug on the human constitution, if he had frequently seen men poisoned by it; but if he thence conjectured that it would be noxious to some other species of animal, he would be said to reason from *analogy*, the only difference being, that the resemblance is less between a man and a brute than between one man and another; and accordingly, it is found that many brutes are not acted upon by some drugs which are pernicious to man.

But, more strictly speaking, *analogy ought to be distinguished from direct resemblance, with which it is often confounded.* Analogy, being a "resemblance of ratios," that should strictly be called an argument from analogy in which the two things (viz., the one *from* which, and the one *to* which we argue) are not necessarily themselves alike, but stand in similar *relations* to some other things; or, in other words, that the common *genus* which they both fall under, consists in a *relation*. Thus an egg and a seed are not in themselves alike, but bear a like relation to the parent bird and to her future nestling on the one hand, and to the old and young plant on the other, respectively; this *relation* being the

genus which both fall under: and many arguments might be drawn from this analogy.

In this kind of argument one *error*, which is very common, and which is to be sedulously avoided, is *that of concluding the things in question to be alike because they are analogous:* to resemble each other in themselves, because there is a resemblance in the relation they bear to certain other things; which is manifestly a groundless inference. Many persons are guilty of this mistake who are, or ought to be, familiar with the Scripture parables; in which the words "compare" and "liken" are often introduced, where it is evident that there could have been no thought of any direct resemblance. A child of ten years old would hardly be guilty of such a blunder as to suppose that members of the church are literally "like" plants of corn—sheep—fish caught in a net,—and fruit-trees.

Another caution is applicable to the whole class of arguments from example; viz., not to consider the resemblance or analogy to extend further (i. e., to more particulars) than it does. In the parable of the unjust steward, an argument is drawn from analogy to recommend prudence and foresight to Christians in spiritual concerns, but it would be absurd to conclude that fraud was recommended to our imitation; and yet mistakes very similar to such a perversion of that argument are by no means rare.

Against both these mistakes our Lord's parables are guarded in two ways. 1st. He selects, in several of them, images the most *remote* possible from the thing to be illustrated in almost every point except the one that is essential, as in the parable referred to just above. 2dly. He employs a great variety of images in illustrating each single point; e. g., a field of corn—a net cast into the sea—a grain of mustard-seed—a lump of

leaven, &c. For, as the thing to be illustrated cannot have a *direct* resemblance, or a *complete* analogy, in *all* these different things, we are thus guarded against taking for granted that this is the case with any one of them.

It may be added that the variety, and also the extreme *commonness* of the images introduced, serve as a help to the memory by creating a multitude of *associations*. Our Lord has inscribed his lessons on almost every object around us.

And, moreover, men are thus guarded against the mistake they are so prone to, and which, even as it is, they are continually falling into, of laying aside their common sense altogether in judging of any matter connected with religion; as if the rules of reasoning which they employ in temporal matters, were quite unfit to be employed in spiritual.

It may be added, that illustrations drawn from things considerably remote from what is to be illustrated will often have the effect of an "a fortiori" argument, as in some of the parables just alluded to, and in that where Jesus says, "If ye then, being evil, know how to give good gifts to your children, *how much more*," &c.

So, also, in the Apostle Paul's illustration from the Isthmian Games, "Now, they do it to obtain a corruptible crown; but we, an incorruptible," &c.

Sound judgment and vigilant caution are nowhere more called for than in observing what differences (perhaps seemingly small) do, and what do not, nullify the analogy between two cases. And the same may be said in regard to the applicability of precedents or acknowledged *decisions* of any kind, such as Scripture precepts, &c., all of which, indeed, are in their essence of the nature of example: since every recorded declaration or injunction may be regarded—in connection

with the persons to whom, and the occasion on which it was delivered—as a *known case;* from which, consequently, we may reason to any other *parallel* case, and the question which we must be careful in deciding will be to whom, and to what it is *applicable.* For, a seemingly small circumstance will often destroy the analogy, so as to make a precedent, precept, &c., inapplicable: and often, on the other hand, some difference, in itself important, may be pointed out between two cases, which shall not at all weaken the analogy in respect of the argument in hand. And thus there is danger both of being misled by specious arguments of this description, which have no real force, and also of being staggered by plausible objections against such examples or appeals to authority, &c., as are perfectly valid. Hence Aristotle observes, that an opponent, if he cannot show that the majority of instances is on his side, or that those adduced by his adversary are inapplicable, contends that they, *at any rate, differ in something* from the case in question.

Many are misled, in each way, by not estimating aright the degree and the *kind* of difference between the two cases. For example, the Apostle Paul recommends to the Corinthians celibacy as preferable to marriage: hence some religionists have inferred that this holds good in respect of all Christians. Now in many most important points Christians of the present day are in the same condition as the Corinthians, but *they* were liable to plunder, exile, and many kinds of bitter persecutions from their fellow-citizens; and it appears that this was *the very ground* on which celibacy was recommended to them, as exempting them from many afflictions and temptations which in such troublous times a family would entail. Now it is not, be it observed, on the *intrinsic importance* of this difference between

them and us that the question turns; but on its importance *in reference* to the advice given. For other illustrations consult Whately's Rhet., part i. chap. ii. § 7.

The phrase "parity of reasoning" is commonly employed to denote analogical reasoning.]

[We now return to our author.]

The last distinction of reasoning divides it into *analytic* and *synthetic*, and refers chiefly to mathematical reasonings. Analysis forms an elegant method of investigating the legitimacy of demonstrations. Synthesis puts together the different steps after investigation, so as to make out a proof, and is the same thing with direct reasoning.

The ancients carried on analysis by means of mathematical figures; the great instrument of it in modern times is algebra. Many examples of the ancient analysis are to be found in Apollonius Pergæus, De Sectione Rationis, and in the problems published by the late Dr. Steuart, of Edinburgh. Every treatise of algebra, but particularly that of Sir Isaac Newton, will furnish specimens of the modern analysis by letters or symbols. All the demonstrations of the Elements of Euclid exhibit examples of *synthesis;* and I need not produce any of them. I shall, therefore, offer only *one example of analysis.* The purpose of it is to try the legitimacy of an investigation, or to discover whether the intermediate ideas, by which a mathematician suspects a demonstration may be accomplished, are sufficient for that purpose. He begins with supposing that the ideas are good media for demonstrating the proposition in question, and constructs his figure on that hypothesis. He supposes, further, the thing done that a problem requires, or the truth established which a theorem proposes to prove. He sets out from the proposition, and reasons backward to the beginning of it; and if he encounter no contradiction, or terminate in no absurdity, he concludes the media to be pertinent and legitimate; if he land in an absurdity or contradiction, he infers that the media are improper, and that the synthetical demonstration will be inconclusive.*

[* See Dugald Stewart's Works, vol. ii. chap. ix. § 8, for a full description of the import of the words *analysis* and *synthesis.*]

If, for example, it were required to analyze the first proposition of the first book of the Elements of Euclid, which proposes to describe an equilateral triangle on a given straight line. The mathematician would describe a triangle on the given line, and would suppose it equilateral. He would reason thus: If the triangle be equilateral, then making one end of the base a centre, and describing a circle with the length of it as a radius, the circle will pass through the other extremities of the base, and of one of the sides; so that the base and one of the sides must become radii of the same circle. If another circle be described from the other end of the base, with the same base taken as a radius, this circle will pass through the other extremities of the base and of the other side. The two circles, therefore, are equal, because their radii are so. This step finishes the analysis, and proves the media to be legitimate, because the reasoning backward has reached its principle, the equality of the two circles, from which the synthesis begins, or from which the truth of the proposition, that the triangle is equilateral, is demonstrated.

Logicians mention some other distinctions of reasoning, which I shall shortly explain, because they sometimes occur in conversation, and often in books. When we argue from principles, or opinions, admitted by the person with whom we reason, whether they be true or not in themselves, we are said to employ an *argumentum ad hominem*. When we urge in our defence some eminent authority, which an antagonist is ashamed to oppose, we are said to employ an *argumentum ad verecundiam*. When we perplex or puzzle an adversary, we offer what is called *argumentum ad ignorantiam*.

EXAMINATION OF THE VALIDITY OF A PROCESS OF REASONING.

[From Dr. Abercrombie's "Intellectual Powers."]

[In examining the validity of a process of reasoning, the mental operation which we ought to perform may be guided by the following considerations:

1. What *statements* does the author propose *as matters of fact;* are these authentic; are they really bearing upon, or connected with, the subject; do they comprise a full and fair view of all the facts which ought to be brought forward in reference to the inquiry; have we reason to suspect that any of them have been disguised or modified,—that important facts have been omitted or kept out of view,—that the author has not had sufficient opportunities of acquiring the facts which he ought to have been possessed of,—or that he has been collecting facts on one side of a question, or in support of a particular opinion?

2. *What propositions are assumed*, either as first or intuitive truths, or as deductions arising out of former processes of investigation; and are we satisfied that these are all legitimate and correct? In particular, does he make any statement in regard to two or more events being connected as *cause* and *effect;* and is this connection assumed on sufficient grounds; *does he assume any general principle as applicable to a certain class of facts;* is this principle in itself a fact, and does it really apply to all the cases which he means to include under it; have we any reason to believe that it has been deduced from an insufficient number of facts,—or is it a mere fictitious hypothesis, founded upon a principle which cannot be proved to have a real existence?

3. *Do these assumed principles and facts really belong to the same subject*—or, in other words, do the facts belong to that class to which the principles apply?

4. *Are the leading terms which he employs fully and distinctly defined as to their meaning;* does he employ them in their common and recognized acceptation; and *does he uniformly use them in the same sense;* or does he seem to attach different meanings to the same term in different parts of the argument?

5. *What are the new conclusions which he deduces from the whole view of the subject;* are these correct and valid; and *do they really follow from the premises* laid down in the previous parts of his argument? For, on this head, it is always to be kept in mind, that a conclusion may be true, while it does not follow from the argument that has been brought to prove it: in such a case the argument is false.

Much of the confusion, fallacy, and sophistry of reasoning arises from these points not being sufficiently attended to, and distinctly and rigidly investigated. An argument may appear fair and consecutive, but when we rigidly examine it we may find that the reasoner has, in his premises, contrived to introduce some statement which is not true in point of fact, or some bold general position which is not correct, or not proved; or that he has left out some fact, or some principle, which ought to have been brought forward in a prominent manner, as closely connected with the inquiry. Hence the necessity for keeping constantly in view the various sources of fallacy to which every process of reasoning is liable, and for examining the elements rigidly and separately before we admit the conclusion.

A process of reasoning is to be distinguished from a process of investigation; and both may be illustrated in the following manner:

All reasoning must be founded on facts, and the ascertained relations of these facts to each other; viz., those of resemblance, cause, effect, &c. *The statement of an ascertained relation of two facts to each other is called a proposition;* such as,—that A is equal to B; that C has a close resemblance to D; that E is the cause of F, &c. These statements, propositions, or ascertained relations, are discovered by intuition or by processes of investigation.

In a process of reasoning, again, *we take a certain number of such propositions or ascertained relations, and deduce from them certain other truths or relations, arising out of the mutual connection of some of these propositions to each other.* Thus, if I state as propositions, ascertained by processes of investigation, that A is equal to B, and that B is equal to C, I immediately decide by a single step of reasoning that A is equal to C in consequence of the mutual relation which both A and C have to B.

Such a process may be rendered more complicated in two ways:—1. *By the number of such ascertained relations, which we require to bear in mind* and compare with each other before we arrive at the conclusion. Thus the relation that A is equal to E might rest on such a series of relations as the following: A is equal to B; B is the double of C; C is the half of D; D is equal to E; therefore A is equal to E.

2. *By the propositions which are the conclusions of one or more steps in a process becoming the premises in a subsequent step.* Thus,—I may take as one process, A is equal to B, and B is equal to C; therefore A is equal to C;—and, as a distinct process, C is equal to D and D is equal to E; therefore C is equal to E. The conclusions from these two processes I then take as the *premises* in a third process, thus: It has been proved that A is equal to C, and that C is equal to E; therefore A is equal to E.

In examining the validity of such processes, there are *two* circumstances or *objects of inquiry* which we ought to keep constantly in view:

1. *Have we confidence in the accuracy of the alleged facts and ascertained relations which form the premises?* Can we rely on the process of investigation by which it is said to have been ascertained that A is equal to B, and that B is equal to C, &c ?

2. *Are the various propositions in the series so related as to bring out a new truth or a new relation?* For it is to be kept in mind, that a series of propositions may all be true and yet lead to nothing: such propositions, for example, as that A is equal to B, C is equal to D, E is equal to F. There is here no mutual relation, and no new truth arises out of the series. But when I say A is equal to B, and B is equal to C, a new truth is immediately disclosed in consequence of the relation which both A and C have to B; namely, that A is equal to C.

Inventive genius, in regard to processes of reasoning, consists in finding out relations or propositions which are thus capable of disclosing new truths or new relations; and in placing them in that order which is calculated to show how those new relations arise out of them. This is the exercise of a reflecting mind; and there may be much acquired knowledge, that is, many facts accumulated by memory alone, without any degree of this exercise or habit of reflection. But both are required for forming a well-cultivated mind: the memory must be stored with information, that is, ascertained facts and ascertained relations; and the power of reflection must be habituated to discover new truths or new relations by a comparison of these facts and ascertained relations with each other. For the discovery of new truths may consist either of new facts or of new relations among facts previously known. Thus, it might happen that we had long been familiar with two facts, without being aware that they had any particular connection. If we were then to ascertain that the one was the cause of the other, it would be a real and important discovery of a new truth, though it would consist only of a new relation between facts which had long been known to us.]

[We return now to Professor Barron's Lecture.]

VARIOUS KINDS OF SOPHISTRY, OR FALSE REASONING.

Logicians have divided sophistry also into different kinds; the most remarkable of which it will be proper to specify, because they are very common. The *first* is called *Ignoratio Elenchi*, and *consists in mistaking or misrepresenting the state of the question under discussion.* This species occurs in most controversies, but particularly in political ones, which now chiefly engage men of learning and ability. Religious and philosophical controversies have, fortunately for the peace of society, almost totally disappeared. The moment a writer engages in controversy, in spite of all the attention he can maintain, partialities lay hold of his mind; his passions warp and mislead his understanding. He reads the performances of his antagonist under the influence of dispositions which induce him to mistake their meaning. He discovers malevolent or insidious designs, which are perceptible by nobody but himself; and he imputes principles and views to his opponent which the latter never entertained or disavows. He introduces principles and views of his own, and he reasons and speculates about them as if they were admitted by the opposite party.*

[* Dr. Watts thus states and illustrates the *Ignoratio Elenchi*:—It occurs *when something else is proved which has neither any necessary connection or consistency with the thing inquired, and consequently gives no determination to the inquiry, though it may seem at first sight to determine the question;* as if any should conclude that St. Paul was not a native Jew, by proving that he was born a Roman: or if they should pretend to determine that he was neither Roman nor Jew, by proving that he was born in Tarsus in Cilicia. These sophisms are refuted by showing that all these three may be true, for he was born of Jewish parents in the city of Tarsus, and by some peculiar privilege granted to his parents or his native city, he was born a denizen of Rome. Thus not one of these three characters of the apostle is inconsistent with the others, and therefore the proving of one of them to be true does not refute the others.

Disputers, when they grow warm, are *apt to run into this fallacy.* They

2. Another species of sophistry is called *Petitio Principii*, and *consists in assuming as true the proposition under debate.* This species is not very frequent in business, because few men are so void of discernment, or so destitute of delicacy and regard to truth, as confidently to maintain what they have not attempted to prove. It is not, however, unfrequent in philosophical and political investigations, in which, either on account of the intricacy or uncertainty of the subjects, disputants arrogate more liberty of obtruding their opinions upon their antagonists, or presume more readily that a bold assertion may be admitted for a proof.

The Peripatetics pretended to prove that the centre of the earth is the centre of the universe, by the following manifest *petitio principii.* "All bodies must move towards the centre of the universe, but we find from experience that all bodies move towards the centre of the earth; therefore the centre of the earth is the centre of the universe." This argument proves nothing; for although we allow that all bodies with which we are acquainted, move towards the centre of the earth, yet it does not follow that all bodies in the universe move towards the centre of the earth. The truth is, that a body near the surface of the earth, moves towards it only by the difference of attraction it exerts above the other great bodies in nature; that all the bodies in the solar system are attracted towards a point near the surface of the sun; and that all the bodies of our solar system, and perhaps of all the systems of the universe, are at-

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dress up the opinion of their adversary as they please, and ascribe sentiments to him which he does not acknowledge; and when they have, with a great deal of pomp, attacked and confounded these images of straw of their own making, they triumph over their adversary as though they had utterly confuted his opinion.

It is a *fallacy of the same kind* which a disputant is guilty of, when he finds that he cannot fairly prove the question first proposed: he then with subtlety *turns the discourse aside to some other kindred point which he can prove, and exults in that new argument wherein his opponent never contradicted him.*

The way to prevent this fallacy, is by keeping the eye fixed on the precise point of dispute, and neither wandering from it ourselves, nor suffering our antagonist to wander from it, or substitute any thing else in its room.]

tracted towards some other point, surely not the centre of the earth, which is the centre of the whole.*

3. Sophistry, again, frequently appears in *arguing from one particular to another, or in inferring general conclusions from particular cases.* The logicians call it a "dicto secundum quid, ad dictum simpliciter."

The argument of the Epicureans of old, to prove the gods of human shape, affords a pertinent example of this sort of sophistry. They maintained that the human was the most beautiful form of all those with which men were acquainted, or of which they had any conception, but the most beautiful form is always supposed to belong to the gods, the best of beings in the universe; it was, therefore, reasonable to conclude, that they were endued with the human form. No connection subsists between the nature of man and that of the gods, to induce us to believe the latter must possess the shape of the former; and we cannot infer, because the figure of man is the most beautiful we are acquainted with, that therefore the form of the gods, admitting them to have some form, cannot be more beautiful than the human. The argument, that the form of a pine-apple, being the most beautiful, perhaps, of vegetable forms, is also the form of the gods, would be equally conclusive. It would be an inference from one particular to another, between which there is no relation; or which have nothing in common, whence such an inference can be deduced.

Should I, again, conclude, from the foolish or iniquitous behavior of some individuals, of a numerous order of men, that all the order are fools or rogues; or, from the unwholesomeness or bad taste of some sort of animal and vegetable food, that all sorts are unwhole-

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[* Dr. Watts defines this sophism as a *supposition of what is not granted;* that is, *when any proposition is sought to be proved by the same proposition in other words, or by something that is equally uncertain and disputed:* as if any one undertake to prove that the human soul is extended through all the parts of the body, because it resides in every member, which is but the same thing in other words. Or, if a Papist should pretend to prove that his religion is the only catholic religion, and is derived from Christ and his apostles, because it agrees with the doctrine of all the fathers of the Church, all the holy martyrs, and all the Christian world throughout all ages: whereas this is the great point in contest, whether their religion *does* agree with that of all the ancients and the primitive Christians, or no.]

some or unpleasant; or, because many bad kings and magistrates have been in the world, that all kings and magistrates are bad men; I argue from premises insufficient to support my inference, because I extend the latter much farther than the former, and suppose there are no exceptions, where there may be thousands. This illegitimate and illiberal logic frequently appears in the intercourse of society, when all the connections, the family, the friends, the order of an impudent or a criminal person, are branded with the improprieties and the errors of which he only has been guilty; while they entertain, perhaps, a more lively disapprobation of his conduct than those who load them with reproach. It is, indeed, difficult to decide whether such a spirit is more characteristic of cruelty, or want of candor. It is cruel, for it displays a strong disposition to criminate the innocent, and to pour into a delicate and honorable mind that pungent vexation which results from the loss of reputation, under a consciousness of having done nothing to deserve such a misfortune. It is void of candor, because no intercourse has subsisted between the culprit and the party accused, which can authorize any inference of blame from the one to the other; and it is not a little uncandid to deduce an inference without, or contrary, to premises.

4. *Many errors and much false reasoning result from forming hypotheses*, to account for the phenomena of nature, or the actions of men, without endeavoring to investigate the true causes and motives from the effects. This species of sophistry the logicians call *Causam assignare quæ causa non est.* Philosophers and speculative politicians have been most prone to indulge in this kind of ratiocination, and many curious examples of it are to be found in physical books, and in real life.

Before the illustrious reformation of philosophy introduced by Lord Bacon, and prosecuted since his time by modern philosophers, particularly by Sir Isaac Newton, the whole science of nature was occupied about hypotheses. A philosopher never looked out to obtain knowledge of the effects and operations actually existing, till he had formed in his closet some theory concerning them, and then he proceeded to twist and to violate every appearance, till it should

accord with the speculation he had thought proper to adopt. One of the most prolific of these theories was the abhorrence which philosophers supposed nature entertained against a vacuum. Prompted by the excessive obstinacy of this disposition, she made the most strenuous efforts to replenish every vacuity which the ordinary operations of causes, or the artifices of men, might attempt to impose upon her. Hence a bottle, out of which the air had been extracted, was broken to pieces, not by the weight of the external air, its true cause, but by the abhorrence nature entertained of a vacuum. Water ascended in a pump, not from the pressure of the atmosphere, but from the same abhorrence of a vacuum.

All the heavenly bodies, says Aristotle, in his Physics, must move in circles, because a circle is the most perfect of all figures, and because bodies moving in such figures meet with least resistance. We would have been much obliged to him, had he told us how he knew that the circle is the most perfect of all figures, and that bodies moving in circles meet with least resistance; but both these reasons are mere suppositions, contrary to truth, as well as the opinion that the heavenly bodies move in circles, which he might have found to be erroneous by a little observation. The same philosopher offers the following singular ratiocination, to support the hypothesis he had adopted concerning the eternity and perfection of the world: "The world is a perfect production, because it is composed of bodies; and bodies are perfect magnitudes, because they consist of three dimensions, length, breadth, and thickness, and cannot admit of more. Lines are not perfect magnitudes, because they have length only, which may easily be made to move into a surface. Surfaces are not perfect magnitudes, because they have only length and breadth, which may easily be made to move into a solid."

All this reasoning is mere conjecture, and relates to the qualities only of magnitudes, not in the least to their merits. The occult qualities of the same author, and his followers, are not more satisfactory sources of natural knowledge. The pulse beats; the loadstone points to the pole; tartar is emetic; poppy produces sleep—because there is a beating quality in the pulse, an attractive quality in the loadstone, an emetic quality in tartar, and a soporific quality in poppy. Such philosophizing resembles the play of children, or the ridicule empyrics, rather than the serious investigations of grave inquirers. It furnishes a humiliating picture of the progress of natural philosophy among the ancients, when such reasoning could be committed to writing, or could find any readers and admirers.

Some apology, however, may be offered for the ancients, because they had not a Bacon to point out the genuine sources of natural knowledge, and to guide their steps in the investigation of it; but what excuse shall we offer for Descartes, who, after the days of Bacon—after considerable progress had been made by Kepler and Copernicus in discovering the true theory of the solar system—pretended to impose on the world a whimsical hypothesis, the result of the most romantic imagination in philosophy, destitute of all foundation in experience, and contradictory to the greater part of the phenomena. It is still more astonishing that such a system should have found abettors, and that the philosophy of Newton should have had to struggle hard for a considerable time before it could obtain a complete victory.

To account, then, for the motions of the heavenly bodies, Descartes filled the solar system with spherical vortices, or circular currents of fluid matter, by which he supposed the primary planets were carried in streams round the sun, and the secondary planets in similar streams round their primaries. But may we not ask a thousand unanswerable questions with respect to this wild theory? Is the specific gravity of the matter which composes these vortices greater than that of the planets it supports and carries along, while no glasses have rendered it visible? Whence is it supplied—what makes it move—or has it any thing in common with any known fluid? What produces the cohesion of its parts—or how are the particles of one vortex prevented from interference with the particles of other vortices, even when they intersect one another? If all be resolved into the power of Omnipotence, the causes of whose operations are inexplicable or unknown, what need was there for vortices as a secondary cause? The only conceivable use of them is to carry on the motions of the heavenly bodies; and it was surely as easy for Omnipotence to accomplish that purpose without them as with them. They seem not superior in respect of ingenuity as a philosophical cause, to the contrivance of the Indian sciolist, who introduced the back of a tortoise to support the elephant which supported the globe of the earth.

[In the language of Dr. Watts: "There is scarcely any thing more common in human life than the sort of deceitful argument just explained. *If any two accidental events happen to concur* [to be contemporaneous], *one is presently made the cause of the other.*

"This sophism was found even in the early ages of the world. When the holy Job was surrounded with uncommon miseries, his own friends inferred that he was a most heinous criminal, and charged him with aggravated guilt as the cause of his calamities, though God himself by a voice from heaven solved this uncharitable sophism, and cleared his servant Job of that severe charge.

"By the same sophism, the Reformation from Popery has been charged with the murder and blood of millions, which, in truth, is to be imputed to the tyranny of the princes and the priests, who would not suffer the people to reform their sentiments and their practices according to the word of God. Thus Christianity, in the early ages, was charged by the heathens with all the calamities which befell the Roman empire, because the Christians renounced the heathen gods and idols."

"*The way to relieve ourselves from such sophisms*, and to secure ourselves from the danger of falling into them, is an honest and diligent inquiry into the real causes of things, with a constant watchfulness against all those prejudices that might warp the judgment aside from truth in that inquiry."]

5. Another species of sophistry is *reasoning in a circle;* or *the assuming of one proposition to prove another, and then resting the proof of the first on the evidence of the second.* The writers of the church of Rome are often accused of committing such blunders. They first prove the divine authority of their church from the holy Scriptures, and then they employ the infallibility of the pope to confirm their interpretation of the Scriptures. They establish the infallibility of the pope by the testimony of the senses, and they employ the same infallibility to destroy the testimony of the senses, when

these remonstrate against the credibility of the doctrine of transubstantiation.

[The following valuable additions on this subject are derived from Dr. Abercrombie's "Intellectual Powers," part iii. sec. 4.

6. A pregnant source of fallacy is *where a reasoner assumes a principle, and then launches out into various illustrations and analogies which are artfully made to bear the appearance of proofs.* The cautions to be kept in mind in such a case are, that the illustrations and the analogies may be of importance, provided the principle has been proved; but that if it has not been proved, the illustrations must go for nothing, and even analogies seldom have any weight which can be considered as of the nature of evidence. Fallacies of this class are most likely to occur in the declamations of public speakers, and when they are set off with all the powers of eloquence, it is often difficult to detect them.

The questions which the hearer should propose to himself *in such cases, are*—Does this really contain any proof bearing upon the subject, or is it mere illustration and analogy, in itself proving nothing? If so, has the reasoner previously established his principle, or has he assumed it, and trusted to these analogies as his proofs?

7. A fallacy somewhat analogous to the preceding, consists in *arguing for or against a doctrine on the ground of its supposed tendency, leaving out of view the primary question of its truth.*

Thus, a speculator in theology will contend, in regard to a doctrine which he opposes, that it is derogatory to the character of the Deity; and, respecting another which he brings forward, that it represents the Deity in an aspect more accordant with the benignity of his character. The previous question in all such cases is,

not what is most accordant with our notions respecting the divine character, but what is truth.

8. *When a principle which is true of one case, or one class of cases, is extended by analogy to others which differ in some important particulars.* The caution to be observed here, is, to inquire strictly whether the cases are analogous, or whether there exists any difference which makes the principle not applicable.

An *example of this fallacy* is found in Mr. Hume's objection to miracles, that they are violations of the established order of nature. The cases are not analogous; for miracles do not refer to the common course of nature, but to the operation of an agency altogether new and peculiar. *Arguments founded upon analogy*, therefore, *require to be used with the utmost caution* when they are employed directly for the discovery or the establishment of truth.

But there is another purpose to which they may be applied with much greater freedom, namely, for repelling objections. Thus, if we find a person bringing objections against a particular doctrine, it is a sound and valid mode of reasoning to contend that he receives doctrines which rest upon the same kind of evidence; or that similar objections might be urged with equal force against truths which it is impossible to call in question. It is in this manner that *the argument from analogy* is employed in the valuable work of *Bishop Butler*. He does not derive from the analogy of nature any direct argument in support of natural or revealed religion; but shows that many of the objections which are urged against the truths of religion might be brought against circumstances in the economy and course of nature which are known and undoubted facts.

9. *A fallacy the reverse of the former* is used by

sophistica writers; namely, *when two cases are strictly analogous, they endeavor to prove that they are not so by pointing out trivial differences, not calculated in any degree to weaken the force of the analogy.*

10. *When a true general principle is made to apply exclusively to one fact, or one class of facts, while it is equally true of various others.* This is called in logical language the non-distribution of the middle term.

In an *example* given by logical writers, one is supposed to maintain that corn is necessary for life, because food is necessary for life, and corn is food. It is true that food is necessary, but this does not apply to any one particular kind of food: it means only that food of some kind or other is so. When simply stated, the fallacy of such a position is at once obvious, but it may be introduced into an argument in such a manner as not to be so immediately detected.

11. *When an acknowledged proposition is inverted, and the converse assumed to be equally true.*

We may say, for *example*, that a badly governed country must be distressed; but we are not entitled to assume that every distressed country is badly governed, for there may be many other sources of national distress. I may say "all wise men live temperately," but it does not follow that every man who lives temperately is a wise man.

It is, at the same time, to be kept in mind that *some propositions do admit of being inverted and still remaining equally true.* This holds most remarkably of *propositions which are universally negative*, as in an example given by writers on logic—"No ruminating animal is a beast of prey." It follows, as equally true, that no beast of prey ruminates. But if I were to vary the proposition by saying, "All animals which do not ruminate are beasts of prey," this would be ob-

viously false: for it does not arise out of the former statement.

12. A frequent source of *fallacy* among sophistical writers, *consists in boldly applying a character to a class of facts in regard to which it carries a general aspect of truth, without attention to important distinctions by which the statement requires to be modified.*

Thus it has been objected to our belief of the miracles of the sacred writings, that they rest upon the evidence of testimony, and that testimony is fallacious. Now, when we speak of testimony in general, we may say, with an appearance of truth, that it is fallacious. But, in point of fact, testimony is to be referred to various species; and though a large proportion of these may be fallacious, there is a species of testimony on which we rely with absolute confidence;—that is, we feel it to be as improbable that this kind of testimony should deceive us, as that we should be disappointed in our expectation of the uniformity of nature.

The kind of sophism now referred to, seems to correspond with that which logical writers have named the *fallacy of division.* It consists in applying to facts in their separate state what only belongs to them collectively. The converse of it is the *fallacy of composition.* It consists in applying to the facts collectively what belongs only to them, or to some of them, in their separate state;—as if one were to show that a certain kind of testimony is absolutely to be relied on, and thence were to contend that testimony in general is worthy of absolute confidence.

13. A frequent fallacy *consists in first overturning an unsound argument, and thence reasoning against the doctrine which this argument was meant to support.* This is the part of a mere casuist, not of a sincere inquirer after truth: for it by no means follows that a

doctrine is false because unsound arguments have been adduced in support of it. Some remarkable *examples* of this fallacy relate to those important principles commonly called first truths, which admit of no processes of reasoning, and consequently are in no degree affected by arguments exposing the fallacy of such processes.

We learn from this, on the other hand, *the importance of avoiding all weak and inconclusive arguments or doubtful statements*, for, independently of the opening which they give for sophistical objections, it is obvious that on other grounds the reasoning is only encumbered by them. It is the part of the casuist to rest the weight of his objections on such weak points, leaving out of view those which he cannot contend with. It may even happen that a conclusion is true, though the whole reasoning may have been weak, unsound, and irrelevant. The casuist, of course, in such a case attacks the reasoning and not the conclusion.

On the other hand, *there may be much in an argument which is true, or which may be conceded; while the most important part of it is untrue and the conclusion false.* An inexperienced reasoner, in such a case, thinks it necessary to combat every point, and thus exposes himself to sound replies from his adversary on subjects which are of no importance. A skilful reasoner concedes or passes over all such positions, and rests his attack on those in which the fallacy is really involved.

An *example* illustrative of this subject is familiar to those who are acquainted with the controversy respecting our idea of cause and effect. Mr. Hume stated in a clear manner the doctrine, that this idea is derived entirely from our experience of a uniform sequence of two events; and founded on this an argument against our belief in a great First Cause. This led to a contro-

versy respecting the original doctrine itself; and it is not many years since it was contended by respectable individuals, that it is nothing less than the essence of atheism to maintain that our notion of cause and effect originates in the observation of a uniform sequence. It is now, perhaps, universally admitted that this doctrine is correct, and that the sophism of Mr. Hume consisted in deducing from it conclusions which it in no degree warranted. This important distinction we formerly alluded to, namely, that our idea of cause and effect, in regard to any two individual events, is totally distinct from our intuitive impression of causation, or our absolute conviction that every event must have an adequate cause.

14. A sophism somewhat connected with the former *consists in disproving a doctrine, and on that account assuming the opposite doctrine to be true.* It may be true, but its truth does not depend upon the falsehood of that which is opposed to it; yet this will be found a principle of not unfrequent occurrence in unsound reasonings.

15. *Fallacies are often introduced in what may be termed an oblique manner, or as if upon a generally admitted authority.* The effect of this is to take off the appearance of the statement being made directly by the author, and resting upon his own authority, by which we might be led to examine its truth. For this purpose it is put, perhaps, in the form of a question, or is introduced by such expressions as the following:— "It is a remarkable fact," "It is somewhat singular," "It has been argued with much justice," "It will be generally admitted," &c.

16. *Fallacy may arise from leaving the main subject of discussion, and arguing upon points which have but a secondary relation to it.* This is one of the

resources of the casuist when he finds himself in the worst of the argument.

Nearly allied to this, is *the art of skilfully dropping part of a statement, when the reasoner finds he cannot support it, and going on boldly with the remainder as if he still maintained the whole.*

17. *Much of the fallacy and ambiguity of processes of reasoning depends entirely on the use of terms.* This may consist in two contending parties *using the same word in different meanings*, without defining what their meanings are; in one or both *using terms in a sense different from their commonly recognized acceptation, or* in using them *in one sense in one part of the argument, and in another in a different part of it.* Such disputes, accordingly, are often interminable; and this mode of disputation is one of the great resources of the casuist, or of him who argues for victory, not for truth.

The *remedy* is, that every reasoner shall be required *clearly to define the terms* which he employs: and that in every controversy certain premises or *preliminaries shall be fixed* in which the parties are agreed. The ambiguity of terms is in fact so extensive a source of fallacy that scarcely any sophistical argument will be found free from it; as in almost every language the same term is used with great diversity of meanings.

Let us take, for example, the term *faith.* It means a mere system of opinions, confidence in testimony, reliance on the integrity, fidelity, and stability of character of other beings, an act of the understanding in regard to abstract truth presented to it, and a mental condition by which truths of another description exert a uniform influence over the moral feelings, the will, and the whole character. In the controversies which have arisen out of this word, it will probably be found

that these various meanings have not been sufficiently distinguished from each other.

A celebrated passage in the "Spirit of Laws" has been justly referred to as a remarkable *example* of the same kind of sophism. "The Deity," says Montesquieu, "has his laws; the material world its laws; intelligences superior to man their laws; the brutes their laws; man his laws." In this short passage the term laws is employed, probably in four senses, remarkably different.

18. There are various other sources of fallacy, consisting chiefly in *the use of arguments which cannot be admitted as relevant in regard to the process of reasoning, though they may carry a certain weight in reference to the individuals concerned.* Among these may be reckoned appeals to high authorities, to popular prejudices, or to the passions of the multitude; and what is called the *argumentum ad hominem.* If a person, for example, be arguing in support of a particular rule of conduct, we may retort upon him that his own conduct, in certain instances, was in direct opposition to it. This may be very true in regard to the individual, but can have no influence in the discussion of the question.

19. One of the most common sources of fallacy consists of *distorted views and partial statements*,—such as facts disguised, modified, or collected on one side of a question; or arguments and authorities adduced in support of particular opinions, leaving out of view those which tend to different conclusions.

Misstatement, in one form or another, may indeed be considered as a most fruitful source of controversy; and, amid the contests of rival disputants, the chief difficulty which meets the candid inquirer after truth is to have the subject presented to his mind without distortion

Hence the importance, in every inquiry, of suspending our judgment, and of patiently devoting ourselves to clear the subject from all imperfect views and partial statements. Without the most anxious attention to this rule, a statement may appear satisfactory, and a deduction legitimate, which are in fact leading us widely astray from the truth.

THE SOUND EXERCISE OF JUDGMENT DISTINGUISHED FROM THE ART OF DISPUTATION.

[From Abercrombie.]

The sound exercise of judgment is widely distinct from the art of ingenious disputation. The object of the former is to weigh fully and candidly all the relations of things, and to give to each fact its proper weight in the inquiry: the aim of the latter is to seize with rapidity particular relations, and to find facts bearing upon a particular view of a subject. This habit, when much exercised, tends rather to withdraw the attention from the cultivation of the former. Thus it has not unfrequently happened that an ingenious pleader has made a bad judge; and that acute and powerful disputants have perplexed themselves by their own subtleties, till they have ended by doubting of every thing. The same observation applies to controversial writing; and hence the hesitation with which we receive the arguments and statements of a keen controvertist, and the necessity of hearing both sides.

We have every reason to believe that though there may be original differences in the power of judgment, the chief source of the actual varieties in this important function is rather to be found in *its culture and regulation.*

1. *The judgment is impaired by deficient culture.* This is exemplified in that listless and indifferent habit of mind in which there is no exercise of correct thinking, or of a close and continued application of the attention to subjects of real importance. Opinions are received from others without the exertion of thinking or examining for one's self.

There is another condition of mind in which opinions are formed on slight and partial examination, perhaps from viewing one side of a question, or, at least, without a full and candid direction of the attention to all the facts which ought to be taken into the inquiry.

2. *The judgment is vitiated by want of due regulation; and this may be ascribed chiefly to two sources—prejudice and passion.* *Prejudice* consists in the formation of opinion before the subject has been examined. The highest degree of it is exemplified in that condition of the mind in which a man first forms an opinion which interest or inclination may have suggested; then proceeds to collect arguments in support of it; and concludes by reasoning himself into the belief of what he wishes to be true.

The same observations apply to *passion*, or the influence exerted by the moral feelings.

There is one class of truths to which these facts apply with peculiar force, namely, those which relate to the moral government of God, and the condition of man as a responsible being. These great truths, and the evidence on which they are founded, are addressed to our judgment as rational beings; they are pressed upon our attention as creatures destined to another state of existence; and the sacred duty from which no individual can be absolved, is a voluntary exercise of his thinking and reasoning powers,—it is seriously and deliberately to consider. On these subjects a man may

frame any system for himself, and may rest in that system as truth; but the solemn inquiry is, not what opinions he has formed, but in what manner he has formed them. Has he approached the great inquiry with a sincere desire to discover the truth; and has he brought to it a mind, neither misled by prejudice nor distorted by the condition of its moral feelings;—has he directed his attention to all the facts and evidences with an intensity suited to their momentous importance; and has he conducted the whole investigation with a deep and serious feeling that it carries with it an interest which reaches into eternity?

THE VARIOUS USE AND ORDER OF SEVERAL KINDS OF PROPOSITIONS AND OF ARGUMENTS IN DIFFERENT CASES

[Compiled from Whately's Rhetoric, Part I. Chapter III.]

SEC. 1.—PRESUMPTIONS AND BURDEN OF PROOF.

It is a point of great importance to decide in each case, at the outset, in your own mind, and clearly to point out to the hearer, as occasion may serve, on which side the *presumption* lies, and to which belongs the [onus probandi] *burden of proof*. For though it may often be expedient to bring forward more proofs than can be fairly *demanded* of you, it is always desirable, when this is the case, that it should be *known*, and that the strength of the cause should be estimated accordingly.

A "presumption" in favor of any supposition means, not a preponderance of probability in its favor, but such a *preoccupation* of the ground as implies that it must stand good till some sufficient reason is adduced against it; in short, that the *burden of proof* lies on the side of him who would dispute it.

Thus, it is a well-known principle of the law, that every man (including a prisoner brought up for trial) is to be *presumed* innocent till his guilt is established. This does not, of course, mean that we are to *take for granted* he is innocent; for if that were the case he would be entitled to immediate liberation; nor does it mean that it is antecedently *more likely than not* that he is innocent; or, that the majority of those brought to trial are so. It evidently means only that the "burden of proof" lies with the accusers; that he is not to be called on to prove his innocence, or to be dealt with as a criminal, till he has done so; but that they are to bring their charges against him, which if he can repel, he stands acquitted.

Thus, again, there is a "presumption" in favor of any individuals, or bodies corporate, to the property of which they are in *actual possession.* This does not mean that they are, or are not, *likely* to be the rightful owners; but merely, that no man is to be disturbed in his possessions till some claim against him shall be established. He is not to be called on to prove his right, but the claimant to disprove it, upon whom consequently the "burden of proof" lies.

A moderate portion of common sense will enable any one to perceive and to show on which side the presumption lies, when once his attention is called to this question; though, for want of attention, it is often overlooked, and on the determination of this question the whole character of a discussion will often very much depend. A body of troops may be perfectly adequate to the defence of a fortress against any attack that may be made against it, and yet if, ignorant of the advantage they possess, they sally forth into the open field to encounter the enemy, they may suffer a repulse. At any rate, even if strong enough to act on the offensive,

they ought still to keep possession of the fortress. In like manner, if you have the "presumption" on your side, and can but *refute* all the arguments brought against you, you have, for the present at least, gained a victory; but if you abandon this position, by suffering this "presumption" to be forgotten, which is in fact *leaving out one of, perhaps, your strongest arguments*, you may appear to be making a feeble attack, instead of a triumphant defence.

The following are a few of the *cases in which it is important*, though very easy, *to point out where the presumption lies.*

(1.) There is *a presumption in favor of every existing institution.* Though susceptible of alteration for the better, the "burden of proof" to that effect lies with him who proposes an alteration, simply on the ground that as a change is not a good in itself, he who demands a change should show cause for it.

(2.) There is *a presumption against any thing paradoxical*, i. e., *contrary to the prevailing opinion.* It may be true, but the burden of proof lies with him who maintains it, since men are not to be expected to abandon the prevailing belief till some reason is shown.

Hence it is, probably, that many are accustomed to apply "paradox" as if it were a term of reproach, and implied absurdity or falsity. But correct use is in favor of the etymological sense. If a paradox is unsupported it can claim no attention; but, if false, it should be censured on *that* ground,—but not for being *new.* To those who, too dull or too prejudiced to admit any notion at variance with those they have been used to entertain (*παρά δόξαν*), *that* may appear nonsense which to others is sound sense. Thus, "Christ crucified" was "to the Jews a stumbling-block" (paradox), "and to the Greeks, foolishness;" because the one "re-

quired a sign" of a different kind from any that appeared; and the others "sought after wisdom" in their schools of philosophy.

(3.) Accordingly *there was a presumption against the Gospel on its first announcement.* A Jewish peasant claimed to be the promised Deliverer, in whom all the nations of the earth were to be blessed. The burden of proof lay with him. No one could be fairly called on to admit his pretensions till he showed cause for believing in him. If he "had not done among them the *works* which none other man did, they had not had sin."

Now, the case is reversed. Christianity *exists;* and those who deny the divine origin attributed to it, are bound to show some reasons for assigning to it a human origin: not, indeed, to prove that it *did* originate in this or that way, without supernatural aid, but to point out some conceivable way in which it *might* have so arisen.

It is, indeed, highly expedient to bring forward evidence to establish the divine origin of Christianity; but it ought to be more carefully kept in mind than is done by most writers, that all this is an argument "ex abundanti," as the phrase is, over and above what can fairly be called for, till some hypothesis should be framed to account for the origin of Christianity by human means. The burden of proof *now* lies plainly on him who rejects the Gospel; which, if it were not established by miracles, demands an explanation of the greater miracle,—its having been established, in defiance of all opposition, by human contrivance.

(4.) It is to be observed that *a presumption may be rebutted by an opposite presumption, so as to shift the burden of proof to the other side.* E. g., Suppose you had advised the removal of some *existing* restriction—

you might be, in the first instance, called on to take the burden of proof, and allege your reasons for the change, on the ground that there is a presumption against every change. But you might fairly reply—"True, but there is another presumption which rebuts the former: every restriction is in itself an evil, and therefore there is a presumption in favor of its removal, unless it can be shown necessary for prevention of some greater evil. I am not bound to allege any *specific* inconvenience; if the restriction is *unnecessary*, *that* is reason enough for its abolition: its defenders, therefore, are fairly called on to prove its necessity."

Sec. 2.—Matters of Fact and of Opinion.

The class of argument called *example*, is not excluded from the proof of matters of opinion (i. e., where we are not said properly to *know*, but to *judge*); since a man's judgment in one case may be aided or corrected by an appeal to his judgment *in another similar case*. It is in this way that we are directed, by the highest authority, to guide our judgment in those questions in which we are most liable to deceive ourselves; viz., what, on each occasion, ought to be our conduct towards another, we are directed to frame for ourselves a similar supposed case, by imagining ourselves to change places with our neighbor, and then considering how, in that case, we should in fairness expect to be treated.

This, however, which is the true use of the celebrated precept "to do as we would be done by," is often overlooked, and it is spoken of as if it were a rule designed to supersede all other moral maxims, and to teach us the intrinsic character of right and wrong. This absurd mistake may be one cause why the precept is so much more talked, than attempted to be applied. For it could not be applied, with any good result, by one

who should have no notions already formed of what is just and unjust.

To take one *instance* out of many: if he had to decide a dispute between two of his neighbors, he would be sure that each was wishing for a decision in his own favor, and he would be at a loss, therefore, how to comply with the precept in respect of either, without violating it in respect of the other. The true meaning of the precept plainly is, that you should do to another, not necessarily what you would *wish*, but what you would *expect as fair and reasonable*, if you were in his place. This evidently presupposes that you have a knowledge of what is fair and reasonable, and the precept *then* furnishes a formula for the *application* of this knowledge, in a case where you would be liable to be blinded by self-partiality.

Illustration and simile distinguished. It is of the greatest consequence to distinguish between examples (of the invented kind), properly so called—i. e., which have the force of arguments—and *comparisons* introduced for the ornament of style, in the form either of simile or of metaphor. Not only is an injurious comparison mistaken for a proof, though it be such as when tried by proper rules affords no proof at all, but also, on the other hand, a real and valid argument is not unfrequently considered merely as an ornament of style, if it happen to be such as to produce that effect—though there is evidently no reason why that should not be fair analogical reasoning, in which the new idea introduced by the analogy chances to be a sublime or a pleasing one. E. g., "The efficacy of penitence, and piety, and prayer, in rendering the Deity propitious, is not irreconcilable with the immutability of his nature and the steadiness of his purposes. It is not in man's power to alter the course of the sun, but it is often in his power

to cause the sun to shine or not to shine upon him; it he withdraws from its beams, or spreads a curtain before him, the sun no longer shines on him; if he quits the shade, or removes the curtain, the light is restored to him; and though no change is in the mean time effected in the heavenly luminary, but only in himself, the result is the same as if it were. Nor is the immutability of God any reason why the returning sinner, who tears away the veil of prejudice or of indifference, should not again be blessed with the sunshine of the divine favor." The image here introduced is ornamental, but the argument is not the less perfect, since the case adduced fairly establishes the general principle required, that, "a change effected in one of two objects having a certain relation to each other, may have the same practical result as if it had taken place in the other."

The mistake in question is still more likely to occur when such an argument is conveyed in a single term employed metaphorically, as is generally the case where the allusion is common and obvious; e. g., "We do not receive as the genuine doctrines of the primitive church what have passed down the *polluted stream* of tradition." The argument here is not the less valid for being conveyed in the form of a metaphor.

Sec. 3.—Arguments from Cause to Effect have the Precedence.

Men are apt to listen with prejudice to the arguments adduced to prove any thing which appears *abstractedly* improbable, and this prejudice is to be removed by the argument from cause to effect, which thus prepares the way for the reception of the other arguments. For example, if a man who bore a good character were accused of corruption, the strongest evidence against

him might avail little; but if he were proved to be of a covetous disposition, this, though it would not alone be allowed to substantiate the crime, would have great weight in inducing his judges to lend an ear to the evidence. And thus in what relates to the future also, the *a priori* argument and example support each other. A sufficient cause being established, leaves us still at liberty to suppose that there may be circumstances which will prevent the effect from taking place; but examples subjoined show that these circumstances do not, at least always, prevent that effect. On the other hand, examples introduced at the first, may be suspected (unless they are very numerous) of being exceptions to the general rule, instead of being instances of it, which an adequate cause previously assigned will show them to be. For example, if any one had argued, from the temptations and opportunities occurring to a military commander, that Bonaparte was likely to establish a despotism on the ruins of the French Republic, this argument, by itself, would have left men at liberty to suppose that such a result could have been prevented by a jealous attachment to liberty in the citizens, and a fellow-feeling of the soldiery with them; then, the examples of Cæsar and of Cromwell would have proved that such preventives are not to be trusted.

Arrangement is a point not perhaps of less consequence in argument, than in the military art. For example, in stating the evidences of our religion, so as to give them their just weight, much depends on the order in which they are placed. The antecedent probability that a revelation should be given to man, and that it should be established by miracles, all would allow to be, considered by itself, in the absence of strong direct testimony, utterly insufficient to establish the conclusion.

On the other hand, miracles, considered abstractedly, as represented to have occurred without any occasion for them or reason being assigned, carry with them such a strong inherent improbability, as could not be wholly surmounted even by such evidence as would fully establish any other matters of fact. But the evidences of the former class, however inefficient alone towards the establishment of the conclusion, have very great weight in preparing the mind for receiving the other arguments, which, again, though they would be listened to with prejudice if not so supported, will then be allowed their just weight.

The writers in defence of Christianity have not always attended to this principle, and their opponents have often availed themselves of the knowledge of it, by combating in detail arguments, the combined force of which would have been irresistible. They argue respecting the credibility of the Christian miracles abstractedly, as if they were insulated occurrences, without any known or conceivable purpose; as, e. g., "What testimony is sufficient to establish the belief that a dead man was restored to life?" and then they proceed to show that the probability of a revelation, abstractedly considered, is not such at least to establish the fact that one *has* been given. Whereas, if it were *first* proved (as may easily be done) merely that there is no such abstract improbability of a revelation as to exclude the evidence in favor of it, and that if one *were* given, it must be expected to be supported by miraculous evidence, then, just enough reason would be assigned for the occurrence of miracles, not indeed to establish them, but to allow a fair hearing for the arguments by which they are supported.

Sec. 4.—When the Premises and when the Conclusion should come first.

A proposition that is well known (whether easy to be established or not), *and which contains nothing particularly offensive, should in general be stated at once, and the proofs subjoined; but one not familiar to the hearers, especially if it be likely to be unacceptable, should not be stated at the outset.* It is usually better in that case to state the arguments first, or at least some of them, and then introduce the conclusion, thus assuming in some degree the character of an *investigator.*

This, indeed, is the usual and natural way of speaking or writing, viz., to begin by declaring your opinion, and then to subjoin the reasons for it. It will sometimes give an offensively dogmatical air, to begin by advancing some new and unexpected assertion; though sometimes, again, this may be advisable, when the arguments are such as can be well relied on, and the principal object is to excite attention and awaken curiosity. And accordingly, with this view, it is not unusual to present some doctrine, by no means really novel, in a new and paradoxical shape.

But *when the conclusion to be established is one likely to hurt the feelings and offend the prejudices of the hearers, it is essential to keep out of sight, as much as possible, the point to which we are tending, till the principles from which it is to be deduced shall have been clearly established;* because men listen with prejudice, if at all, to arguments that are avowedly leading to a conclusion which they are indisposed to admit; whereas, if we thus, as it were, mask the battery, they will not be able to shelter themselves from the discharge. The observance, accordingly, or neglect of this rule, will often make the difference of success or failure.

It will *often be advisable to advance very gradually to the full statement of the proposition required*, and to prove it, if one may so speak, by instalments; establishing separately, and in order, each part of the truth in question.

Thus Paley (in his Evidences) first proves that the apostles, &c., *suffered;* next, that they encountered their sufferings *knowingly;* then, that it was *for* their testimony that they suffered; then, that the events they testified were *miraculous;* then, that those events were the *same* as are recorded in our books, &c., &c.

Advance from general to particular. It will often happen that some *general principle*, of no very paradoxical character, may be proposed in the outset (just as besiegers break ground at a safe distance, and advance gradually till near enough to batter); and when that is established, an unexpected and *unwelcome application* of it may be proved irresistibly.

We shall thus have to reverse, in many cases, the order in which, during the act of composition (or premeditation), the thoughts will have occurred to our minds; for in reflecting on any subject, we are usually disposed to *generalize;* to proceed from the particular point immediately before us, successively, to more and more comprehensive views; the opposite order to which will usually be the better adapted to engage and keep up attention, and to effect conviction.

Waiving a question. It is *often expedient*, sometimes unavoidable, *to waive for the present some question, or portion of a question, while our attention is occupied with another point.* Now it cannot too carefully be kept in mind, that it is a common mistake with inaccurate reasoners (and a mistake which is studiously kept up by an artful sophist) to suppose that what is thus *waived* is altogether *given up.* "Such a one does not

attempt to prove this or that;" "he does not deny so and so;" "he tacitly admits that such may be the case," &c., are expressions which one may often hear triumphantly employed on no better grounds. And yet it is very common in mathematics for a question to be waived in this manner.

The only remedy is, to state distinctly and repeatedly that you do not abandon as untenable such and such a position, which you are not at present occupied in maintaining: that you are not to be understood as admitting the truth of this or that, though you do not at present undertake to disprove it.

When needful to account for any fact. If the argument *a priori* has been introduced, in the proof of the main proposition in question, there will generally be no need of afterwards adducing causes to account for the truth established, since that will have been already done in the course of the argument: on the other hand, it will often be advisable to do this when arguments of the other class have alone been employed.

For it is in every case agreeable and satisfactory, and may often be of great utility, to explain where it can be done, the causes which produce an effect that is itself already admitted to exist. But it must be remembered that it is of great importance to make it clearly appear *which* object is, in each case, proposed; whether to *establish* the fact, or to *account* for it; since otherwise we may often be supposed to be employing a feeble argument: for that which is a satisfactory explanation of an admitted fact, will frequently be such as would be very insufficient to prove it, supposing it were doubted.

SECTION 5.—*Refutation of objections should generally be placed in the midst of the argument;* but nearer the beginning than the end.

If, indeed, very strong objections have obtained much currency, or have been just stated by an opponent, so that what is asserted is likely to be regarded as paradoxical, it may be advisable to begin with a refutation; but when this is not the case, the mention of objections in the opening will be likely to give a paradoxical air to our assertion, by implying a consciousness that much may be said against it. If, again, all mention of objections be deferred till the last, the other arguments will often be listened to with prejudice by those who may suppose us to be overlooking what may be urged on the other side.

Sometimes, indeed, it will be difficult to give a satisfactory refutation of the opposed opinions till we have gone through the arguments in support of our own: even in that case, however, it will be better to take some brief notice of them early in the composition (or discussion), with a promise of afterwards considering them more fully, and refuting them. This is Aristotle's usual procedure.

A *sophistical use is often made of this last rule*, when the objections are such as cannot really be satisfactorily answered. The skilful sophist will often, by the promise of a triumphant refutation hereafter, gain attention to his own statement, which, if it be made plausible, will so draw off the hearer's attention from the objections, that a very inadequate fulfilment of that promise will pass unnoticed, and due weight will not be allowed to the objections.

Two modes of refutation. The first is by proving the contradictions of the proposition we oppose; the

second, by overthrowing the arguments by which it has been supported.

Direct and indirect reasoning are employed indifferently in refutation; but the latter (in which the absurdity or falsity of a proposition opposed to our own is proved) is often chosen, as it affords an opportunity of holding up an opponent to scorn and ridicule, by deducing some very absurd conclusion from the principles he maintains, or according to the mode of arguing he employs. Nor indeed can a fallacy be so clearly exposed to unlearned persons in any other way.

Ironical effect of indirect arguments. When we employ the categorical form, and assume as true the premises we design to disprove, it is evident we must be speaking *ironically*, and in the character, assumed for the moment, of an adversary; when, on the contrary, we use the hypothetical form, there is no irony. Butler's *Analogy* is an instance of the latter procedure: he contends that *if* such and such objections were admissible against religion, they *would* be applicable equally to the constitution and course of nature. Had he, on the other hand, assumed, for the argument's sake, that such objections against religion *are* valid, and had thence proved the condition of the natural world to be totally different from what we see it to be, his arguments, which would have been the same in substance, would have assumed the ironical form. This form is adopted in the "Historic Doubts," whose object is to show that objections similar to those against the Scripture history, and much more plausible, might be urged against all the received accounts of Napoleon Bonaparte.

It is in some respects a recommendation of this latter method, and in others an objection to it, that the sophistry of an adversary will often be exposed by it in a

ludicrous point of view, and this even when no such effect is designed; the very essence of gist being its *mimic sophistry*. This will often give additional force to the argument by the vivid impression which ludicrous images produce; but again it will not unfrequently have this *disadvantage*, that weak men, perceiving the wit, are apt to conclude that nothing *but* wit is designed, and lose sight perhaps of a solid and convincing argument, which they regard as no more than a good joke. Having been warned that "ridicule is not the test of truth," and that "wisdom and wit" are not the same thing, they distrust every thing that can possibly be regarded as witty, not having judgment to perceive the combination, when it occurs, of wit with sound reasoning. The ivy-wreath completely conceals from their view the point of the Thyrsus.

Moreover, if such a mode of argument be employed on serious subjects, some are scandalized by what appears to them a profanation; not having discernment to perceive when it is that the ridicule does, and when it does not, affect the solemn subject itself.

And, moreover, the resentment and mortification felt by those whose unsound doctrines or sophistry are fully exposed and held up to contempt or ridicule,—this they will often disguise from others, and sometimes from themselves, by representing the contempt or ridicule as directed against serious or sacred subjects, and not against their own absurdities.

Too much stress is often laid *upon refutation*—in the sense of objections to the premises or the reasoning: for, first, not only specious, but real and solid arguments, such as it would be difficult or impossible to refute, may be urged against a proposition which is nevertheless true, and may be satisfactorily established by a *preponderance* of probability. It is in strictly

scientific reasoning alone that all the arguments which lead to a wrong conclusion must be fallacious. In what is called moral or probable reasoning, there may be sound arguments and valid objections on both sides.

Now, it often happens that the inexperienced reasoner, thinking it necessary that every objection should be satisfactorily answered, will have his attention drawn off from the arguments of the opposite side, and will be occupied perhaps in making a weak defence, while victory was in his hands. The objection, perhaps, may be unanswerable, and yet may safely be allowed, if it can be shown that more and weightier objections lie against every other supposition. This is a most important caution for those who are studying the evidences of religion. Let the opposer of them be called on, instead of confining himself to detached cavils, and saying, "How do you answer this?" and "how do you explain that?" to frame some consistent hypothesis to account for the introduction of Christianity by human means; and then to consider whether there are more or fewer difficulties in his hypothesis than in the other.

Sophistical refutation. On the other hand, one may often meet with a sophistical refutation of objections, consisting in counter-objections urged *against something else* which is taken for granted to be, though it is not the *only alternative.* E. g., If an exclusive attention to mathematical pursuits be objected to, it may be answered by deprecating the *exclusion* of such studies. It is thus that a man commonly replies to the censure passed on any vice he is addicted to, by representing some other vice as worse: e. g., if he is blamed for being a sot, he dilates on the greater enormity of being a thief, as if there were any need (or any apology) for being either.

Over-estimate of the force of refutation. Secondly, the force of a refutation is often overrated: an *argument* which is satisfactorily answered, ought merely to go for nothing; it is possible that the *conclusion* drawn may nevertheless be true; yet men are apt to take for granted that the conclusion itself is disproved, when the arguments brought forward to establish it have been satisfactorily refuted; assuming, when perhaps there is no ground for the assumption, that these are *all* the arguments that could be urged.

Hence *the danger of ever advancing more than can be well maintained*, since the refutation of *that* will often quash the whole. A guilty person may often escape by having too much laid to his charge: so he may also by having too much evidence against him; i. e., some that is not in itself satisfactory. Thus a prisoner may sometimes obtain acquittal by showing that one of the witnesses against him is an infamous informer and spy; though perhaps if that part of the evidence had been omitted, the rest would have been sufficient for conviction.

The maxim here laid down applies only in those causes where there really *are* some *weighty* arguments to be urged.

On the above principle, that a weak argument is positively hurtful, is founded a most important maxim, that it is not only the fairest, but also the wisest plan, to *state objections in their full force;* at least whenever there does exist a satisfactory answer to them; otherwise, those who hear them stated more strongly than by the uncandid advocate who had undertaken to repel them, will naturally enough conclude that they are unanswerable. And when the objections urged are not only unanswerable, but (what is more) *decisive*,—when some argument that has been adduced, or some portion

of a system, &c., is perceived to be really unsound, it is the wisest way fairly and fully to confess this, and abandon it altogether.

It is important to observe, that *too earnest and elaborate a refutation of arguments which are really insignificant*, or which their opponent wishes to represent as such, will frequently have the effect of giving them importance. Whatever is slightly noticed, and afterwards passed by with contempt, many readers and hearers will very often conclude (sometimes for no other reason) to be really contemptible. But if they are assured of this again and again with great earnestness, they often begin to doubt it.

In other cases, also, it may happen that it shall be possible and *dangerous to write or speak too forcibly.* When, indeed, the point maintained is one which most persons admit, but which they are prone to *lose sight of*, or to underrate in respect of its importance, or not to dwell on with an attention sufficiently practical, that is just the occasion which calls on us to put forth all our efforts in setting it forth in the most forcible manner possible. Yet, even here, it is often necessary to caution the hearers against imagining that a point is *difficult* to establish, because its *importance* leads us to dwell very much upon it. Some, e. g., are apt to suppose, from the copious and elaborate arguments which have been urged in defence of the authenticity of the Christian Scriptures, that these are books whose authenticity is *harder to be established* than that of other supposed ancient works; whereas, the fact is very much the reverse. But the *importance* and the *difficulty* of proving any point are very apt to be confounded together, though easily distinguishable.

In combating deep-rooted prejudices, and maintaining unpopular and paradoxical truths, the point to be

aimed at should be, to *adduce what is sufficient, and not much more than is sufficient, to prove your conclusion.* If (in such a case) you can but satisfy men that your opinion is decidedly more probable than the opposite, you will have carried your point more effectually than if you go on much beyond this to demonstrate, by a multitude of the most forcible arguments, the extreme absurdity of thinking differently, till you have affronted the self-esteem of some, and awakened the distrust of others. Laborers who are employed in driving wedges into a block of wood, are careful to use blows of no greater force than is just sufficient. If they strike too hard, the elasticity of the wood will throw out the wedge.

Another danger is to be apprehended from employing a great number and variety of arguments (whether for refutation or otherwise); namely, that some of them, though really unanswerable, may be drawn from topics of which the unlearned reader or hearer is not, by his own knowledge, a competent judge; and these a crafty opponent will immediately assail, keeping all the rest out of sight, knowing that he is thus transferring the contest to another field, in which the result is sure to be practically a drawn battle.

There is *a difference between simply disproving an error, and showing whence it arose.* Merely to prove that a certain position is untenable, if this be done quite decisively, *ought*, indeed, to be sufficient to induce every one to abandon it: but if we can also succeed (which is usually a more difficult task) in tracing the erroneous opinion up to its *origin*,—in destroying not only the branches but the root of the error,—this will afford much more complete satisfaction, and will be likely to produce a more lasting effect.

The *arguments which should be placed first in order*,

are, *cæteris paribus, the most obvious, and such as naturally first occur.*

This is evidently the natural order; and the adherence to it gives an easy, natural air to discourse. It is seldom, therefore, worth while to depart from it for the sake of beginning with the most powerful arguments (when they happen not to be also the most obvious); or, on the other hand, for the sake of reserving these to the last, and beginning with the weaker; or, again, of imitating, as some recommend, Nestor's plan of drawing up troops, placing the best first and last, and the weakest in the middle.

It will be advisable, however (and by this means you may secure this last advantage), when the strongest arguments naturally occupy the foremost place, to *recapitulate in a reverse order*, which will destroy the appearance of anti-climax, and is also in itself the most easy and natural mode of recapitulation.

OF DISPOSITION OR METHOD.

[From Watts' Logic.]

It is the art of method which must secure our thoughts from that confusion, darkness, and mistake which unavoidably attend the meditations and discourses even of the brightest genius who despises the rules of it.

Method is the disposition of a variety of thoughts on any subject in such order as may best serve to discover unknown truths, to explain and confirm truths that are known, and to fix them in the memory.

RULES OF METHOD.

RULE I. It must be *safe and secure from error*

Great care must be employed in laying the foundation and forming the scheme of thought upon any subject. Those propositions which are to stand as first principles, and on which the whole argument depends, must be well guarded. The general definitions and descriptions should be as accurate as the nature of the subject will bear. As we proceed in our argument, no feeble link must be admitted into the chain; and our argument must be drawn up with such just limitations as may preclude or anticipate objections, so far as it may be done without too much encumbering the process of argument.

Rule II. The method should be plain, and easy of comprehension. We should begin with those things which are more obvious, and thus prepare the way for those which are more difficult. Too many thoughts or reasonings should not be crowded into a single sentence or paragraph. Numerous subdivisions should be avoided.

Rule III. Method should be *distinct*, and each part of the subject should be kept in its own place.

Rule IV. The method of treating a subject should be *full*, so that nothing may be wanting: nothing which is necessary or proper should be omitted.

When called to *explain* a subject, the difficult or obscure parts should not be passed over.

The *parts* or *properties* of any subject should be *enumerated* in a complete and comprehensive manner.

In *asserting* or *proving* any truth, every doubtful or disputable point should be well supported and confirmed.

In the *illustration* or *arguing of a point of difficulty* we may employ copiousness and diffuseness of language, so as to set the truth in various lights, and turn the various sides of it to view.

In drawing up a *narrative* of any matter of fact, no important circumstance should be omitted.

This fulness of method does not require that every thing should be said which can be said upon any subject; but only so much as is necessary to the design in view, and which has a direct tendency to this end.

Rule V. As method should be full without deficiency, so it should be *brief, or without superfluity.* All needless repetitions of the same thing in different parts of the discourse should be avoided: no one part should be drawn out to a tedious length, or so far as to preclude a proper attention to subsequent, and perhaps more important parts of a discourse. Explicatives should not be multiplied where there is no difficulty, or darkness, or danger of mistake. Nor should those things be sustained by a formal proof which are too plain to require it. Again, there are other things so evidently false that they require no refutation.

There is a happy medium to be observed in our method, so that the brevity may not render the sense obscure nor the argument feeble; and on the other hand, that the fulness of our method may not waste time, tire the hearer, or fill the mind with trifles and impertinences.

Rule VI. *The facts of a discourse should be well connected.* Keep always in view the main end and design, and let all the parts of discourse tend visibly towards it. Let the mutual relation and dependence of the several branches be so just and evident, that every part may naturally lead onward to the next, without any large chasms to interrupt the scheme. In passing from one part of discourse to another, the most graceful and appropriate forms of transition should be studied and practised.]

LECTURE X.

SYLLOGISM.

In explaining the nature of reasoning, I have not pretended to teach any art regarding the investigation of truth and knowledge, except careful attention to attain clear ideas, and patient comparison of these ideas. I know no other art, nor do I know any useful and successful inquirer who has employed any other. From the days of Aristotle, however, to the revival of letters, somewhat more than two centuries ago, all learned men, almost, imagined that they possessed such an art, and many still hold the syllogistic method of that eminent ancient to be what they call an analysis of the art of reasoning, though they admit that it cannot easily be employed to any useful purpose in philosophy or business.

The history of learning has not to exhibit another such singular and curious phenomenon, as the progress and the influence of the logic of Aristotle. It was delineated almost as fully in the writings of that author, as it has been in the numerous and more voluminous compositions of his followers. If we except the addition of examples of the different figures and modes of syllogisms, little important improvement has been added to the researches and explanations of the inventor.

In all Aristotle's writings there is some obscurity. He either had not, or would not exert, the faculty of explaining his meaning simply and intelligibly. His expression is often equivocal and abrupt. His mode of thinking is abstract and refined, and his affectation of system is so great that he multiplies divisions and

subdivisions without end. He exhausts the patience, and puzzles the attention of the most partial and the most intelligent of his readers. Of all his numerous treatises, however, his logic is perhaps the most obscure, owing partly to the intricate nature of the topics it treats, but chiefly to the exceedingly involved manner in which he has discussed them. The obscurity and the ingenuity of the works of Aristotle contributed, perhaps, to establish his authority during the darkness of the middle ages. The admiration of ignorant men is often the surest support of their attachment; and the best method of attaining that admiration, is to astonish them with the discussion of mysteries which they do not understand. Whether we shall allow this theory to be satisfactory or not, the fact is certain, that no doctrines of any other philosopher ever acquired such absolute dominion over the minds of men.

The works of the Stagirite, by a series of events a little singular, remained in a great measure unknown for many years after his death. He had left them to Theophrastus, who succeeded him in the peripatetic school. Theophrastus transmitted them to Neleus, his heir, who, after selling a copy of them to Ptolemy Philadelphus, king of Egypt, conveyed them to Scepsis, a city of Troas, his native country, where they were deposited in a vault, for fear, it seems, they should fall into the hands of the king of Pergamus, to whom that country belonged, and who, it is probable, wished to appropriate them at a price much below their value.

In this vault they remained near a hundred and thirty years, till they were rendered almost illegible by dampness and vermin. They were, however, rescued from destruction, and were sold, or conveyed to Apellicon, a peripatetic philosopher of Athens, who caused them to be transcribed and deposited in his library. There they remained till Sylla, at the head of a Roman army, in the Mythridatic war, conquered Athens, when he got possession of the library of Apellicon, and transmitted it to Rome. Tyrannion, a Greek grammarian, an acquaintance of Cicero and Atticus, who resided at Rome, obtained a copy of them by the good offices of the library-keeper of Sylla. This critic was at much pains to get them transcribed and corrected, and from his copy, chiefly, the Romans seem to have received their knowledge of the peripatetic philosophy.

From the copy of the works of Aristotle purchased by the king of Egypt, the Arabians probably first derived their acquaintance with him; but the knowledge of his works in Italy appears to have

been extinguished by the inundations of German barbarians, who subverted the Roman dominion in the fifth century. It is at least certain, that no part of his works was much read or admired in Europe till the middle of the eleventh century, and that the knowledge of them then acquired was chiefly obtained from the Arabians. The logic of Aristotle, in particular, was formed for cavilling and disputation; and it soon gained applause and authority, when *the schoolmen*, the most subtle and disputatious order of men the world ever saw, began to attract the notice of society.

Lanfranc, Archbishop of Canterbury, is commonly reputed the father of this order, and he was the first who drew the attention of the public to the works of the Stagirite. All learned men of Europe soon became logicians and Aristotelians. Schools were erected, colleges were endowed, literary degrees were conferred. In many cathedrals, and in most monasteries, academical institutions were established; and the whole knowledge then in vogue was to form syllogisms with readiness and address, to perplex, confound, and conquer an adversary. Formal and public disputations were frequently held among the members of these societies, and society sometimes challenged society to wage keen syllogistic war against one another. Logical champions travelled about, like knights-errant, in quest of literary adventures, and entered the lists with whatever combatant would venture to take up their gauntlet of defiance. Victory crowned a disputant with the highest applause, and commonly procured him some appellation significant of the eminence of his syllogistic powers, such as Doctor Profundus, Subtilis, Irrefragabilis. Never was the zeal of men so great for the cultivation of useful knowledge, as was the ambition of the schoolmen to become adepts in the art of disputation, and to silence an antagonist whom they expected not to convince.

In such an age, and with such men, the logic of Aristotle could not fail to be received with avidity. His authority became supreme and indisputable. It was the most insufferable impudence to controvert his opinions, or even to insinuate suspicion of error. The sacred writings claimed not greater reverence than the works of this philosopher, and his name was little less respected than that of Jesus Christ. He was denominated *divine;* large treatises were written to prove the sal-

vation of his soul; he was considered as the best guardian of the Christian faith; and, in several churches in Germany, his morals were read to the people in place of the gospels. Through the whole almost of the scholastic period, which continued above five hundred years, from the middle of the eleventh century to the middle of the sixteenth, did the authority of Aristotle remain uncontrollable over the minds of men, and did eminence in the syllogistic art procure the greatest fame, and the highest honors.

But the influence of the opinions of Aristotle was not confined to the schools of disputation; the civil power sometimes supported their authority; and men of more erudition, and of more polished times than the schoolmen, testified their approbation in terms of the strongest applause. An era so late as the end of the sixteenth century, supplies a remarkable incident to illustrate this observation.

Petrus Ramus, a lecturer in the college of Navarre, published a thesis to obtain the degree of Master of Arts, in which he ventured to controvert some of the tenets, and to censure the logic of this philosopher. The affair quickly made a great noise. France was alarmed, and the University of Paris took the matter under their cognizance. They resented so highly the conduct of Ramus, that they would not be content with academical censures. They first prosecuted him before the parliament of Paris, that some civil punishment might be inflicted suitable to the enormity of the heresy of which he had been guilty, and which, they maintained, sapped the foundations of religion. Suspicious, however, that the parliament might not canvass the matter with the same zeal and partiality which animated themselves, they next employed every intrigue to remove the discussion from the parliament to the king and council.

Francis the First entered fully into the views of the university. He appointed judges to try the merit of the dispute; he approved their decision, and he published a royal mandate enjoining the observation of it. The sentence is a curious literary monument, and marks the high ascendency which the writings of Aristotle still

preserved over the minds of their readers. It declared Ramus guilty of rashness, impudence, arrogance, and ignorance; that his thesis was a malicious attack on the logic of Aristotle, which all the world admired, and which he did not understand; that the publication of it should be suppressed for the peace of society and the interest of truth; and that no person whatever should transcribe, print, disperse, or read it, under pain of the sverest punishment.

The purpose of the logic of Aristotle, and of the numerous writers on the same subject who have appeared since his time, is to teach us to reason by syllogism. What, then, is this wonderful syllogism with which mankind have been so long and so deeply fascinated, and which they deemed the handmaid of truth and the bulwark of religion? Is there any charm in the name? Will it make us mechanical reasoners, without the necessity of using our faculties? Can it show any other channel to truth and knowledge, than that which all men in earnest employ, and which consists in the comparison of our ideas, in order to discover their agreement or disagreement? To answer these questions in a satisfactory manner, I must explain the manner of its formation, and unfold the ingredients of which it consists.

A *syllogism** is an argument, or a step of an argu-

[* When the state of our knowledge does not warrant us in judging at once whether two conceptions agree or differ, we seek for some other judgment or judgments that contain the grounds for our coming to a decision. This is called reasoning, which may be defined "the process of deriving one judgment from another." The technical name for that one single step of the process, of which the longest chains of reasoning are but the repetition, is *syllogism* (or computation), a word which has acquired its present sense from the resemblance between computation proper, i. e., gathering the result of other judgments that we call reasoning. A syllogism has been defined, "A sentence or thought in which, from something laid down and admitted, something distinct from what we have laid down, follows of necessity." The form or essence of a syllogism, therefore, consists, not in the truth of the judgments laid down, or of that which is

ment, containing three propositions, the first called the *major*, the second the *minor*, and the third the *conclusion*. For example,

All animals are mortal;
Man is an animal;
Therefore man is mortal.

Each proposition possesses quantity and quality. By quantity is meant, that it is *universal* or *particular;* by quality, that it is an *affirmative* or *negative*. A *universal proposition*,* as was formerly explained, includes a whole genus, or a whole species, and affirms or denies something of them. The major proposition of the syllogism now adduced is an example. "All animals are mortal," is a *universal affirmative* proposition. Mortality is affirmed of the whole genus of ani-

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arrived at, but in the production of a new and distinct judgment, not a mere repetition of the antecedents, the truth of which cannot be denied without impugning those we have already accepted for true.—*Thomson.*]

[* *Universal judgments distribute*, i. e., introduce the whole of their subject. In "All the fixed stars twinkle" and "No man is wise at all times," it is obvious that we are speaking of the whole of the fixed stars, and of men, respectively; and therefore each term is distributed.

Negative judgments distribute the predicate. If "No minerals are nutritious for animals" is asserted, it means that nothing which is nutritious for animals can have the properties of minerals; and so the term "Nutritious for animals" is distributed; and if we suppose that only *some* nutritious things are asserted not to agree with minerals, it would follow that *some other* nutritious things might agree with, i. e., might be minerals, so that we might say at the same time—"No minerals are nutritious for animals," and "Some minerals are nutritious for animals;" whereas we know that we meant by the former judgment to exclude the possibility of our receiving the latter. If the predicate of a negative is not distributed, it can have no real negative power; for if the subject is only excluded from one part of the predicate, it may be included in some other part.

The word *all*, in its proper logical sense, means "each and every;" but it stands sometimes for "All taken together"—"All these claims upon my time overpower me." Hence may arise an ambiguity; instead of the *all* in its logical use, we may put *every;* but to exercise the same liberty with the other sense of it would be absurd. The example given could not mean "Every single claim upon my time overpowers me."—*Thomson.*]

mals. "No animal can live without food," is a *universal negative* proposition. A *particular proposition* includes only a part of a genus, or of a species, and affirms or denies something of it. Accordingly, "Some* animals are long lived," is a *particular affirmative* proposition. "Some animals are not endowed with reason," is a *particular negative* proposition. Hence it appears that *four sorts of propositions only can enter a syllogism.* They must be either universal affirmatives, or universal negatives; particular affirmatives, or particular negatives. These four sorts of propositions, for the convenience of distinguishing them, are denominated by the four following vowels, *a*, *e*, *i*, *o*. *A*, signifies universal affirmative; *e*, universal negative; *i*, particular affirmative; and *o*, particular negative. To assist the memory, these vowels and their properties are formed into the two following monkish verses:

"Asserit *e* negat *a*, sed universaliter ambæ.
Asserit *i* negat *o*, sed particulariter ambo."

Although a syllogism consists of three propositions, it contains only three ideas, which are called *terms*, each of which is twice used, to make up the propositions. One of these ideas, which is always the predicate of the conclusion, is called the *major term;* another the *minor term*, which is always the subject of the conclusion; and the third, the *middle term.* The reasoning of the syllogism lies in pointing out the agreement or disagreement of the major and minor

[* The word *some* is the cause of confusion in its logical use. In what sense is the "some" of a particular proposition to be understood? Does it mean, "Some, we know not how many," or, "A certain number which we may have in our thoughts?" The word appears to be employed in the two senses, of "some or other" and "some certain," in common language; and it becomes a question in which sense it is to be regarded in logic.—*Thomson.*]

terms, by comparing them with the middle term. The middle term never appears in the conclusion, or third proposition; it is compared successively with the major and minor terms in the first two propositions, or premises, as they are sometimes called. It is twice used in the premises; it may be either the predicate of the major premise, and the subject of the minor; or, it may be the subject of the major premise, and predicate of the minor. In like manner the major and minor terms stand once in each premise, and they are both used in the conclusion.

For example, in the syllogism formerly quoted, the minor term is "man," the major term is "mortal," and the middle term is "animal." In the first premise, "All animals are mortal," the middle term, "animal," is compared with the major term, "mortal." "Animal" is the subject; "mortal" is the predicate; and it is affirmed or predicated of all animals, that they are mortal. In the second premise, "Man is an animal," "man," the minor term, is compared with "animal," the middle term; and it is affirmed, or predicated of man, that he is an animal. The middle term, "animal," is the subject of the former premise, and the predicate of the latter. In the conclusion, "Man is mortal," the minor term, "man," is inferred to agree with the major term, "mortal," because, in the premises, they were both found to agree with the same middle term, "animal."

We have now advanced a considerable way in the explanation of the nature of a syllogism. In order to complete the illustration of all those which are denominated regular, or categorical syllogisms, it will be necessary only to unfold the meaning of mode and figure. *Figure relates to the position of the middle term; mode, to the quantity and quality of the propositions of which the syllogism consists.*

The middle term may be the subject of the major premise, and the predicate of the minor, when the syllogism is of the *first* figure; or, it may be the predicate of both premises, which makes a syllo

gism of the *second* figure; or, it may be the subject of both premises, when the syllogism will be of the *third* figure; or, it may be the predicate of the major premise, and the subject of the minor, when the syllogism will be of the *fourth* figure. As the middle term never appears in the conclusion, and must appear twice in the premises, it will appear that these four are all the positions of which it is susceptible; and consequently that the number of figures must also be four. I should add examples of each figure, but I rather choose to defer them till I have explained the meaning of mode, when the same examples will serve to illustrate both figures and modes.

I have already remarked, that all syllogisms are composed of four sorts of propositions: universal affirmatives, or universal negatives; particular affirmatives, or particular negatives; and that these propositions are discriminated by the vowels *a*, *e*, *i*, *o*. *The mode of a syllogism is determined by the species of the propositions of which it is composed.*

They may be three universal affirmatives marked by three *a*'s, or three universal negatives marked by three *e*'s, or three particular affirmatives marked by three *i*'s, or three particular negatives marked by three *o*'s; or, they may be two universal affirmatives, and one universal negative, marked by two *a*'s and one *e*; or two universal affirmatives, and one particular affirmative, marked by two *a*'s and one *i*; or two universal affirmatives, and one particular negative, marked by two *a*'s and one *o*. Each of these combinations makes a mode; and there may be as many modes in each figure as there are possible combinations of the four vowels. It is found, by computation, that the number of possible combinations is no fewer than sixty-four for each figure, so that all the four figures will furnish two hundred and fifty-six modes.

But of these possible modes, a few only form legitimate syllogisms. *The first figure has no more than four conclusive modes;* one consisting of three universal propositions, denoted by three *a*'s, to which has been given, by the schoolmen, the name of *Barbara*, because it contains the vowel *a* three times. A *second*, consist-

ing of a universal negative major proposition, a universal affirmative minor proposition, and a universal negative conclusion, denoted by the vowels *e*, *a*, *e*, to which has been given the name of *Celarent*, because the vowels of this mode form the vowels of that word. A *third*, containing a universal affirmative major proposition, a particular affirmative minor proposition, and a particular affirmative conclusion, denoted by the letters *a*, *i*, *i*, out of which is formed the word *Darii*, for the name of this mode. A *fourth*, consisting of a universal negative major premise, and a particular affirmative minor premise, and a particular negative conclusion, marked by the vowels *e*, *i*, *o*, of which has been formed the word *Ferio*, for the name of the last mode.

In the second figure are found also four conclusive modes; and the quantity and quality of their proportions will be readily comprehended from their names, in which, as in the preceding figure, the vowels only are significant. *Cesare* is the name of the first mode; *Camestres*, of the second; *Festino*, of the third; *Baroco*, of the fourth. *The third figure has six modes*, denoted by the hard words, *Darapti*, *Felapton*, *Disamis*, *Datisi*, *Bocardo*, *Ferison.* Hence it appears that all the legitimate modes of the first three figures are no more than fourteen. The names of these modes and figures were, to aid the memory, formed by the schoolmen into the following barbarous hexameters:

> "Barbara, Celarent, Darii, Ferio, dato primæ;
> Cesare, Camestres, Festino, Baroco, secundæ;
> Tertia grande sonans recitat Darapti, Felapton;
> Adjungens Disamis, Datisi, Bocardo, Ferison."

Aristotle has not treated separately of the modes of the fourth figure, because he found they could be reduced to those of the former figures. I shall now offer some examples to illustrate the theories which I have

endeavored to explain. The following is a *syllogism of the first figure*, and of the mode *Barbara:*

All bad men are miserable;
All tyrants are bad men;
Therefore, all tyrants are miserable.

The major term is "miserable," the minor term is "tyrants," and the middle term is "bad men." The middle term is the subject of the major premise, "all bad men are miserable," and the predicate of the minor premise, "all tyrants are bad men." The syllogism is therefore of the first figure, which requires these positions of the middle term. The propositions are all universal affirmatives; consequently, the mode is *Barbara.*

The next shall be an example of the second figure, and of the mode *Cesare.*

No deceitful man merits confidence;
All honest men merit confidence;
Therefore, no honest man is deceitful.

"Deceitful," is the major term; "honest man," is the minor term; and "merits confidence," is the middle term. The middle term is the predicate of both the premises, "no deceitful man merits confidence," "all honest men merit confidence," which are the situations of the middle term required by the second figure. The first premise is universal negative, marked by the letter *e*, "no deceitful man merits confidence;" the second universal affirmative marked by the letter *a*, "all honest men merit confidence;" the conclusion universal negative, marked again by the letter *e*, "no honest man is deceitful." These letters constitute the mode *Cesare.*

The subsequent syllogism is of the third figure, and of the mode *Darapti.* It is one of Keckerman's examples:

All good men are happy;
All good men hate the devil;
Therefore, some men who hate the devil are happy.

The major term is, "happy;" the minor term is, "hate the devil;" and the middle term is, "good men." The middle term is the sub

ject of both premises, "all good men are happy," "all good men hate the devil," which constitutes a syllogism of the third figure. The major premise, "all good men are happy," is a universal affirmative; the minor premise, "all good men hate the devil," is the same; the conclusion, "some men who hate the devil are happy," is a particular affirmative. The two premises are noted by the two *a*'s, the conclusion by *i*, and these letters form the mode *Darapti*.

I have now produced an example of a mode of each figure. It would be tedious to exemplify all the modes;* but to prevent suspicion of unfair procedure,

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[* For the sake of gratifying curiosity, the editor subjoins the following examples of all the modes, selected from a London work:

The *first figure* contains *four* moods, or modes, whose names are *Barbara*, *Celarent*, *Darii*, and *Ferio*, of which the following are given as examples:

BAR- Every wicked man is miserable;
BA- All tyrants are wicked men;
RA. Therefore, all tyrants are miserable.

CE- They who neglect their duty are not wise,
LA- Idle boys neglect their duty;
RENT. Therefore, idle boys are not wise.

DA- They who please God are happy;
RI- Some poor men please God;
I. Therefore, some poor men are happy

FE- Disobedient children are not blessings,
RI- Some children are disobedient;
O. Therefore, some children are not blessings.

There are *four* modes also in the *second figure*, whose names are *Cesare*, *Camestres*, *Festino*, and *Baroco*, examples of which are here subjoined:

CE- No liar is fit to be believed;
SA- Every good Christian is fit to be believed;
RE. Therefore, no good Christian is a liar.

CA- All pious men deserve esteem;
MES- No robbers deserve esteem;
TRES. Therefore, no robbers are pious men.

FE- No sin is excusable;
STI- Some faults are excusable;
NO. Therefore, some faults are not sins.

BA- Every part of religion is rational;
RO- Some doctrines are not rational;
CO. Therefore, some doctrines are no part of religion.

I shall add a few instances promiscuously, from the different figures and modes, in order to illustrate further the nature of this famous instrument of reasoning, and to lay a foundation for the remarks I have to offer upon it. The following syllogism is of the mode *Bocardo*, which belongs to the third figure. The name shows that the first premise, *o*, must be a particular negative; the second premise, *a*, a universal affirmative; and the conclusion, *o*, a particular negative. The third figure requires the middle term to be the subject of both premises; all these requisites are thus fulfilled.

Some good men are not rich;
All good men are happy;
Therefore, some happy men are not rich men.

The modes in the *third figure* are *six*, named as follows: *Darapti*, *Felapton*, *Disamis*, *Datisi*, *Bocardo*, *Ferison*, and these are examples:

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 appear to be religious;
TON. Therefore, some who appear to be religious are not pleasing to God.

DI- Some men are honorable;
SA- All men have their imperfections;
MIS. Therefore, some who have imperfections are honorable.

DA- All virtuous men are happy;
TI- Some virtuous men are beggars;
SI. Therefore, some beggars are happy.

BO- Some wars are not to be avoided;
CAR- All wars produce bloodshed;
DO. Therefore, some bloodshed is not to be avoided.

FE- No afflictions are pleasant;
RI- Some afflictions are good for us;
SON. Therefore, some things that are good for us are not pleasant.]

The next example is of *Camestres*, a mode of the second figure. It is another of Keckerman's:

All men are animals;
No stone is an animal;
Therefore, no stone is a man.

"Animal," is the middle term, and is the predicate of both premises, as required by the second figure. The first premise is *a*, universal affirmative; the second, *e*, universal negative; the conclusion, *e*, also universal negative. Hence the mode *Camestres*.

The mode *Darii* shall furnish another example:

Every thing base should be avoided;
Some pleasures are base;
Therefore, some pleasures should be avoided.

"Avoided," is the major term; "pleasures," the minor term; "base," the middle term. Base, is the subject of the major premise, and the predicate of the minor, which refers the syllogism to the first figure. The first premise, marked *a*, is universal affirmative; the second premise and the conclusion are marked *i*, *i*, particular affirmatives; hence the mode *Darii*.

In each figure there are singular syllogisms, or syllogisms relative to individuals, which cannot be reduced to any of the modes. They are allowed, however, to be legitimate syllogisms, and they are constructed on the same principle with the rest. The only difference is, that all the established modes refer to genus and species; these refer to species and individual. I shall present some instances from Keckerman:

Every traitor deserves death;
Judas was a traitor;
Therefore, Judas deserved death.

This syllogism is of the first figure, where the middle term, "traitor," is the subject of the major premise, and

the predicate of the minor premise. The following is a particular example of the second figure:

Socrates was an ugly man;
Plato was not an ugly man;
Therefore, Plato was not Socrates.

The middle term, "ugly," is the predicate of both premises. The same logician supplies a particular example of the third figure:

Judas did not obtain salvation;
Judas was an apostle;
Therefore, every apostle did not obtain salvation.

"Judas," is the middle term, and the subject of both premises, according to the requisitions of the third figure.*

[* Dr. Thomas Reid presents the following analysis of the three syllogistic figures explained in the preceding lecture. He remarks:

The compass of the syllogistic system as an engine of science, may be discerned by a compendious and general view of the conclusion drawn, and the argument used to prove it, in each of the three figures.

In the *first* figure, the conclusion affirms or denies something of a certain species or individual; and the argument to prove this conclusion is, that the same thing may be affirmed or denied of the whole genus to which that species or individual belongs.

In the *second* figure, the conclusion is, that some species or individual does not belong to such a genus; and the argument is, that some attribute common to the whole genus does not belong to that species or individual.

In the *third figure*, the conclusion is, that such an attribute belongs to part of a genus; and the argument is, that the attribute in question belongs to a species or individual which is part of that genus.

I apprehend that, in this short view, every conclusion that falls within the compass of the three figures, as well as the means of proof, is comprehended. The rules of all the figures might be easily deduced from it; and it appears that there is only one principle of reasoning in all the three; so that it is not strange that a syllogism of one figure should be reduced to one of another figure.

The *general principle* in which the whole terminates, and of which every categorical syllogism is only a particular application, is this, that *what is affirmed or denied of the whole genus, may be affirmed or denied of every species and individual belonging to it.* This is a principle of undoubted certainty indeed, but of no great depth. Aristotle and all the logicians assume it as an axiom or first principle from which the syllogistic system takes its departure; and after a tedious voyage, and great expense of demonstrations, it lands at last in this principle as its ultimate conclusion. *O curas hominum! O quantum est in rebus inane!—Reid's Works*, vol. i. p. 108.]

LECTURE XI.

SYLLOGISM—ITS MERIT AS A MODE OF REASONING.

Besides regular, categorical, or pure syllogisms, there are others called *irregular*, because they cannot be reduced to the rules of mode and figure. I shall briefly explain the nature of these, more in conformity with general practice, than because they are of much importance.

Enthymeme is the first species I shall mention. It takes place when one of the propositions which constitute the premises is omitted,* and the conclusion is drawn from the other premise, as if the syllogism were regular and complete. The following is an example. If I say, either,

> Whatever thinks is a spiritual substance,
> Therefore, the mind of man is a spiritual substance;

Or,

> The mind thinks,
> Therefore, the mind is a spiritual substance;

I omit the minor proposition in the former case, and infer the conclusion from the major. I omit the major proposition in the latter case, and infer the same conclusion from the minor. It is supposed in both cases that the connection of the conclusion with either premise, is so apparent as to render unnecessary the pres-

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[* Gr. *εν*, and *θυμος*, *mind;* something understood *in the mind*, and not expressed.—*Brande.*

"What is an *enthymeme?*" quoth Cornelius. "Why, an enthymeme," replied Crambe, "is when the major is indeed married to the minor, but the marriage kept secret."—*Arbuthnot and Pope.*]

ence of the other premise. The premise in this case is called the antecedent; and the conclusion, the sequela, or the inference.*

Sorites is another species of irregular syllogism, and consists in conjoining a series of propositions in such a manner, that the predicate of the preceding proposition forms the subject of the succeeding. The following is an example:

The mind is a thinking substance. A thinking substance is a spirit. A spirit has no extension. What has no extension has no parts. What has no parts is indissoluble. What is indissoluble is immortal. Therefore, the mind is immortal.

This species, like the former, is only a train of syllogisms abridged, into which it may easily be resolved in the following manner:

All thinking substances are spirits;
The mind is a thinking substance;
Therefore, the mind is a spirit.
Spirits have no extension;
The mind is a spirit;
Therefore, it has no extension.
Things having no extension have no parts;
The mind has no extension;
Therefore, it has no parts.

[* The arguments used in thinking, speaking, or writing, are never drawn out in strict technical form, except by practised logicians, desirous of exhibiting their art to those who, like themselves, are conversant with it. A sentence which contains the materials of a syllogism, not technically expressed, has been called an enthymeme. Aristotle understands by this a syllogism such as would be used in rhetoric, where the full and orderly expression of premises and conclusion would seem labored and artificial. And as the omission of one of the premises is a common, perhaps the commonest, feature of enthymemes, logicians have defined them as syllogisms with one premise suppressed. But we may also omit the conclusion, or invert the order of premises and conclusion; and unless we extend the name enthymeme to these cases, we put a considerable restriction upon its original meaning. Let the enthymeme then be defined—*an argument in the form in which it would naturally occur in thought or speech.*—*W Thomson.*]

Things having no parts are indissoluble;
The mind has no parts;
Therefore, the mind is indissoluble.
Things indissoluble are immortal;
The mind is indissoluble;
Therefore, the mind is immortal.

Hence it appears, that all the intermediate propositions between the first and the last of a *Sorites* may be formed into separate syllogisms; and that it is equivalent to an argument formed of as many syllogisms as the argument contains intermediate propositions. It may also be observed, that every idea of the *Sorites* is twice repeated, and that it might be further abridged without any detriment to the evidence it communicates. Had it stood as follows, the agreement of its ideas would have been as clear, and its evidence as satisfactory, as in any other form. Mind—thinking substance—spirit—without extension—without parts—indissoluble—immortal.*

Irregular syllogisms, further, are *either conditional or disjunctive.* The subsequent is a *conditional syllogism.* "If the air press down bodies below it, it must be a heavy body." The legitimacy of this species of reasoning consists in the inference following necessarily from the premise. It has scarcely any logical form. It is an

[* Three or more premises in which the predicate of each is the subject of the next, with a conclusion formed from the first subject and last predicate of the premises, have been called a sorites, or accumulating argument, from the Greek word σωρὸς, *a heap.* The name is not very appropriate; the German title of chain-argument (kettenschluss) expresses better the nature of the process in which the mind goes on from link to link in its reasoning, without thinking it necessary to draw out the conclusions as it passes. Where the premises are all universal affirmative judgments, not the least confusion can arise from thus postponing till the end the realization of the results. But where the premises are judgments of different kinds, the reasoning is more difficult to follow, and it may be necessary to draw out each syllogism separately, in order to see whether it is in a valid mood, and, if otherwise, what is the fault in it.—*Thomson.*]

inference from a principle, which inference must be admitted if the principle be granted.

A *disjunctive syllogism* is proper and legitimate, when the predicate of the premise admits an alternative, and when the predicate and alternative involve every possible case. If the predicate be obviously false, the alternative of course must be true. Example:

> The mind of man is either corporeal or spiritual:
> It is not corporeal; therefore, it is spiritual.

If the predicate and the alternative do not exhaust every case that can exist, the conclusion will be illegitimate. For example: "All neighbors are either friends or enemies; they are not friends; therefore, they are enemies." In this instance, the predicate and the alternative do not include every case. The greatest part of neighbors may be neither friends nor enemies; they may be altogether indifferent, and accordingly the conclusion is ridiculous.

[The *Dilemma* is a complex argument, partaking both of the conditional and disjunctive. It is *a syllogism with a conditional premise, in which either the antecedent or consequent is disjunctive.* It may prove a negative or an affirmative conclusion.

The word Dilemma means "double proposition," so that the whole argument takes its name from the one mixed judgment in it. When this is more than double, as in, "If a prisoner is legally discharged, either the magistrate must refuse to commit, or the grand jury ignore the bill, or the common jury acquit, or the crown exercise the prerogative of pardon," the argument has been called a Trilemma, Tetralemma, or Polylemma, according to the number of members the judgment may have.—*Thomson.*]

I observed, in the last lecture, that of the hundred

and ninety-two modes which the three figures contain, no more than fourteen are conclusive. I shall now explain the *means by which* these *inconclusive modes are set aside.* Aristotle has been at great pains to examine them separately, and to demonstrate the fallacy of the conclusions they infer; but later logicians have contracted this process by the aid of a few rules, which are either self-evident, or result naturally from the construction of a syllogism. The *first rule* is—

"A syllogism must consist only of three terms."

This rule excludes all ambiguities in the expression which would introduce supernumerary terms. All the terms are twice repeated; and in every repetition the same sense should be retained. If the sense be changed the syllogism is vitiated; because the ambiguous word will supply as many terms as it has meanings. The subsequent syllogism is, therefore, fallacious and ridiculous.

> Whatever thinks is immaterial;
> All spirits think;
> Therefore, spirit of wine is immaterial.

The double meaning of the word *spirit* renders the conclusion absurd. The syllogism really consists of four terms, while apparently it consists only of three. The *second rule* is—

"No syllogism can consist entirely of particular or negative propositions."

Particular propositions cannot infer a conclusion, because, as I shall afterwards show, the syllogistic art hangs on this principle, "Whatever agrees or disagrees with a genus, agrees or disagrees with every species of that genus;" if, therefore, in any syllogism no genus is found; if different parts only, either of a genus or a species, are compared together, no conclusion can re-

sult, because any inference from such premises is illegitimate. Take the following example:

Some animals are beautiful;
Some animals are not beautiful;
Therefore, some women are beautiful, and some women are not beautiful.

Three negative propositions cannot compose a legitimate syllogism, because they form three detached assertions; and the truth or falsehood of any one of them has no dependence on the other two. The subsequent example will be an illustration:

No matter thinks;
No spirit is matter;
Therefore, no matter thinks, and no spirit is matter.

Another rule is—

"The conclusion must be particular, if either of the premises be particular; and negative, if either of the premises be negative."

This is what the logicians mean when they tell us, that "Conclusio sequitur partem debiliorem." The "pars debilior" is a negative, or a particular premise, compared with an affirmative or a universal premise. This rule needs little illustration. If either of the premises be negative or particular, the conclusion cannot be general or affirmative, otherwise it would be more extensive than the premises from which it is deduced. The superstructure would project beyond the foundation; a manifest solecism both in philosophy and in arts. In the following syllogism the conclusion is negative, because the major premise is negative:

No man is immortal;
All kings are men;
Therefore, no king is immortal.

In the subsequent syllogism the conclusion is particular, because the minor premise is particular

All good men are happy;
Some men are good;
Therefore, some men are happy.

The *last rule* is—

"The middle term must be taken universally in one of the premises."

When the middle term is taken universally, it refers to a genus; when it is taken particularly, it refers to a species. Were it not taken universally in one of the premises, they would not include a genus, and, consequently, there would be no ratiocination from it to the species. The syllogism would consist of particular propositions, and I have already shown, that from such premises no legitimate inference can result. Take the following example:

Whatever thinks is immaterial;
The mind of man thinks;
Therefore, the mind of man is immaterial.

The middle term, "whatever thinks," is taken universally, or includes a genus in the major premise. It is taken particularly, or refers to the species, "mind of man," in the minor premise. The application of these rules evinces the illegitimacy of the inconclusive modes, and establishes the authority of the fourteen conclusive ones.

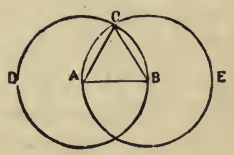
I have now advanced every view and explication which appeared requisite to unfold the nature of that wonderful method of reasoning, on which Aristotle, the first and best logician, has spent so much of his time and labor; about which all the learned men of Europe were employed for many ages; and from eminence in which the highest literary honors were derived; some

times the administration of the most important civil offices were conferred. I proceed to discuss *its merits as an engine of knowledge.*

That I may do it no injustice in the course of the discussion, it may be necessary again to observe, that every syllogism must not be considered as containing a complete argument, or a train of reasoning, if the argument requires more than one intermediate idea. One syllogism, on the contrary, contains only one step of a train of reasoning; and in arranging a train of reasoning in the syllogistic form, as many syllogisms must be made as there are steps or comparisons in that train. I must also observe, that by proceeding in this manner, any train of reasoning, in arts, in science, or in business, may be converted into syllogisms.

These remarks may be illustrated by exhibiting the first demonstration of the first book of Euclid in this form. It will be recollected, that the object of the proposition is to prove, that the triangle described on the given line A B, by means of the two circles, the semi-diameter of each of which is the line A B, is equilateral. From the properties of the circle, each of the sides of the triangle is found equal to the base, and the inference is drawn necessarily, that all the sides are equal. This train of reasoning, expressed by syllogisms, will stand as follows:

All the semi-diameters of the same circle are equal;
The lines A B, A C, are semi-diameters of the same circle;
Therefore, these lines are equal.



All the semi-diameters of the same circle are equal;
The lines B A, B C, are semi-diameters of the same circle;
Therefore, these lines are equal.

Whatever things are equal to the same thing, are equal to one another;
The lines A C and B C are equal to the line A B;
Therefore, the three lines A B, A C, B C, are equal to one another.

Triangles, having their sides equal, are called equilateral;
The triangle A B C has all its sides equal;
Therefore, it is equilateral.

Now, the point to be investigated is, Whether the syllogistic method of exhibiting this demonstration, or any other train of reasoning, is preferable to that adopted by Euclid, or to the method which places the successive ideas in the nearest juxtaposition, and expresses them in the fewest and plainest words.

From the example I have given, it will appear that the syllogistic form is not nearly so concise as that of Euclid; for all the ideas of Euclid's demonstration are expressed in one half of the words which are requisite to constitute these four syllogisms. Even Euclid's manner of expression is copious and full; and the evidence of his demonstration would not perhaps have been impaired, had he communicated it as follows. The semi-diameters A B and A C, of the one circle, are equal; the semi-diameters of A B and B C, of the other circle, are equal also; therefore, the triangle is equilateral, and described on the given line.

But, besides being more prolix, the syllogistic method adds no light to the evidence by which the ideas of the train of reasoning are perceived, which light the ideas possess not in their natural state of juxtaposition. Every syllogism consists of three terms, and the reasoner must have discovered the middle term, and observed the agreement of it with the extremes, before he can form the terms into a syllogism. After the syllogism is formed, the mind acquires no satisfaction from the contemplation of it, which the terms did not suggest in the state of juxtaposition.

Suppose I were to prove that Socrates was content with his condition, because he was a wise man; I should have three terms of which a syllogism may be formed, and which in their natural order would stand thus: Socrates—a wise man—content with his condi-

tion. I affirm, that the agreement between Socrates and contentment, is as obvious and satisfactory in the simple juxtaposition of the terms, as it is after these terms are formed into the following syllogism:

> All wise men are content with their condition;
> Socrates was a wise man;
> Therefore, Socrates was content with his condition.

Further, *as the syllogistic form communicates no additional light, so neither does it assist in discovering middle terms.* The principal operations of any investigation, are the invention of intermediate ideas, and the comparison of them with one another, and with the extremes. The invention of middle terms is the chief operation; and excellence in it is the most important qualification any inquirer can possess. It seems to depend on natural sagacity and acuteness, fortified and improved by exercise. No art can be of any use. From syllogism, in particular, no aid can be derived. It does not even pretend to give any aid. Its only object is to assist in the second operation, the comparison of ideas; and we have seen that the syllogistic exhibition is not more perspicuous than the natural one.

But the most singular phenomenon of syllogism is, that the *conclusion is often a self evident proposition, sometimes even trifling and insignificant.* The discussion of this point will unfold the whole mystery and merit of the method. In converting a train of ideas into the syllogistic form, there must be made as many syllogisms as there are steps or comparisons in the train, and as many as there are ideas in the train, except one. Each idea of the train beginning with the second, is the major term of its respective syllogism; the other two terms of the same syllogism are, one a genus, and the other a species of that genus. The ma

jor term is compared first with the one, and then with the other, and must be found either to agree or disagree with both. Take, for example, the train of reasoning formerly mentioned;—Human mind—thinking substance — immaterial — indissoluble — immortal; — and convert it into syllogisms.

Whatever perceives, judges, and reasons, is a thinking substance;
The human mind perceives, judges, and reasons;
Therefore, the human mind is a thinking substance.

In this syllogism, the major term, "thinking substance," and the second idea of the train, is compared with the genus, "whatever perceives, judges, and reasons," in the first premise, and is found to agree with it. The same major term is compared again with the species, "the human mind," in the conclusion, and is found also to agree with it. Now, the genus, "whatever perceives, judges, and reasons," the species, "the mind of man," and "thinking substance," are all the terms of this syllogism.

Whatever thinks is immaterial;
The human mind thinks;
Therefore, the human mind is immaterial.

"Immaterial," the third idea of the train, and the major term of this syllogism, is compared first with the genus, "whatever thinks," and next with the species, "the human mind," and is found to agree with both.

Whatever is immaterial is indissoluble;
The mind of man is immaterial;
Therefore, the mind of man is indissoluble.

"Indissoluble," the fourth idea of the train, and the major term of this syllogism, is compared first with the genus, "whatever is immaterial," and next with the

species, "the mind of man," and is found to agree with both.

Whatever is indissoluble is immortal;
The mind of man is indissoluble;
Therefore, the mind of man is immortal.

"Immortal," the last idea of the train, and the major term of this syllogism, is compared first with the genus, "whatever is indissoluble," and then with the species, "the mind of man," and is found to agree with both.

From these examples it appears, that the major term of every syllogism is one of the ideas of the train, beginning with the second; that the minor term of every syllogism is the first idea of the train; and that the middle term of every syllogism is a genus of the minor. The syllogisms I have formed are all of the first figure; but this circumstance is no objection against the remarks I have to make, because *all the other figures and modes proceed on the same principle, namely, the comparison of the major term first with a genus of the minor, and next with the minor as a species;* or the syllogisms of the other figures may be reduced to those of the first in which these conditions take place.

What, then, is the mystery of this mighty syllogistic art, which has so long engaged the attention of learned men, and is still accounted by many of that description to contain something meritorious, or to be an analysis of the art of reasoning? It is no more than this, "*Whatever agrees with any genus, will agree with every species of that genus; or whatever disagrees with any genus, will disagree with every species of that genus.*" If this be the principle of the art, can we wonder at the self-evidence of all the conclusions of all its syllo-

gisms, or that it never gratified science or business with the discovery of any useful truth?*

When we reflect how genus and species are formed, it is impossible but that what agrees or disagrees with the one, must agree or disagree with the other. What is a genus? It is a collection of all the qualities common to the species it includes. What agrees, then, with the common qualities of any species, must agree with the species itself, as far as these qualities extend; and syllogism carries the agreement of the major term, with the minor and middle terms, no further than these qualities. What agrees with the genus must agree with the species; it is only an agreement with the same thing in different situations; the major term agrees or disagrees with perfectly the same qualities, in the genus, with which it agrees or disagrees in the species. Hence it appears, that after finding the agreement of the major term with the genus of the minor term, the conclusion, which asserts the agreement of the major term with the species, or the minor term itself, must be self-evident. To arrange things into species and genera, is extremely convenient for the purposes of language, and some of the purposes of philosophy; but to pretend to reason from the one to the other, seems to be the quintessence of vanity or folly.

Examine any demonstration of Euclid, any investigation of morals, politics, or affairs, and it will be found that no man in earnest reasons from a genus to a species. A mathematical demonstration consists of the comparison of quantities of the same species; figures are compared with figures; angles with angles; and lines with lines. An inquiry concerning justice or charity, compares these virtues with the principles of

[* Mill's Logic, p. 117, may here be consulted with advantage.]

reason, equity, the laws of the community, and the situations of persons. A process in the arts refers to the theory of the art, and to the example of the most reputable and successful practitioners.

It is of little consequence to maintain that the syllogistic art sometimes makes its way into the most serious business, and that every indictment for a crime, for instance, is a syllogism; of which the major premise contains the description of the crime, and its punishment appointed by the law; the minor premise, the application of the law to the case of the criminal, and the conclusion, an assertion that the criminal merits the punishment appointed by the law.

That an indictment stands in the form of a syllogism, no doubt can exist. The major term is the punishment; the crime committed is the minor term and the species; the description of the crime in the law is the middle term and the genus. The major term, or the punishment, agrees with the genus, or the law; and it agrees also, perhaps, with the minor term and the species, or the crime of the prisoner. But there is not here, strictly speaking, any reasoning. A trial is no more than a scrutiny, whether a particular crime is included under a general law, or whether the indictment accords with truth, when it asserts that the prisoner, in taking away the property or the life of his fellow-creature, has committed the crime of theft or murder, of which crimes the perpetrators are declared by the law to deserve punishment. There is no more reasoning in this case than in every application of the principles of science to the particular cases they include.

The assertion, for example, that a particular field consists of a certain number of acres, is equally a syllogism with an indictment charging a culprit with the commission of a crime punishable by law. The number of acres, suppose ten, is the major term; the length and breadth of the field, is the minor term and the species; the number of acres of which all fields of the length and breadth of the one under consideration consist, is the middle term and the genus. The major term, ten acres, agrees with the dimensions of all fields of the extent of the one under consideration; it agrees also with the dimensions of the one under consideration; and, therefore, it agrees both with the genus and the species of the syllogism.

But, while I reprobate the syllogistic method, for being nugatory and insignificant as an instrument of reasoning, I admit its high merit as an *engine of wrangling and controversy.* It was the happiest contrivance that could have been devised for conducting those public disputations and trials of skill which for ages prevailed in Europe, and in which the discovery of truth was no part of the ambition of the combatants. The most ready and acute framer of syllogisms was sure to retire triumphant. The grand contest was not whether the syllogism contained any useful truth. The object of one party was to maintain its legitimacy; of the other, to controvert or deny one of its propositions. Wrangling thus became a science; and the mind of man, apparently enthusiastic in the discovery of truth and knowledge, never wandered further from their paths.

[Dr. George Campbell (in his Philosophy of Rhetoric, p. 86), observes:

In the ordinary application of the syllogistic art to matters with which we can be made acquainted only by experience, it can be of little or no utility. So far from leading the mind, agreeably to the design of all argument and investigation, from things known to things unknown, and by things evident to things obscure, its usual progress is, on the contrary, from things less known to things better known, and by things obscure to things evident. When, in the way of induction, the mind proceeds from individual instances to the discovery of such truths as regard a species, and from these, again, to such as comprehend a genus, we may say, with reason, that as we advance, there may be in every succeeding step, and commonly is, less certainty than in the preceding; but in no instance whatever can there be more.

Now the customary procedure in the syllogistic science, is from general to special, and consequently from less to more obvious. In scientific reasoning the case is very different, as the *axioms* or universal truths from which the mathematician argues, are so far from being the slow result of induction and experience, that they are self-evident. They are no sooner apprehended than they are necessarily assented to.

But to illustrate the matter by an example, take the following specimen in *Barbara*, the first mode of the first figure:

All animals feel;
All horses are animals;
Therefore, all horses feel.

It is impossible that any reasonable man who really doubts whether a horse has feeling, or is a mere automaton, should be convinced by this argument; for, supposing he uses the names *horse* and *animal* as standng in the same relation of species and genus which they bear in the common acceptation of the words, the argument you employ is, in effect, but an affirmation of the point which he denies, couched in such terms as include a multitude of other similar affirmations, which, whether true or false, are nothing to the purpose. Thus *all animals feel* is only a compendious expression for *all horses feel*, *all dogs feel*, *all eagles feel*, and so through the whole animal creation. I affirm, besides, that the procedure here is from things less known to things better known. It is possible that one may believe the conclusion who denies the major: but the reverse is not possible; for, to express myself in the language of the art, that may be predicated of the species which is not predicable of the genus, but that can never be predicated of the genus which is not predicable of the species. If one, therefore, were under such an error

in regard to the brutes, true logic, which is always coincident with good sense, would lead our reflections to the indications of perception and feeling given by those animals, and the remarkable conformity which in this respect, and in respect of their bodily organs, they bear to our own species.]

CONCLUDING CHAPTER.

DR. THOMAS BROWN'S ANALYSIS OF THE SCHOLASTIC LOGIC.

[THE *retardation of the progress of reasoning*, is one circumstance which distinguishes the *syllogism;* but the absurdity, which is implied in the very theory of it, distinguishes it still more. It constantly assumes, as the first stage of that reasoning by which we are to arrive at a particular truth, our previous knowledge of that particular truth. The major is the very conclusion itself under another form, and its truth is not more felt than that which it professes to develop. Thus, to take one of the trifling examples which, in books of logic, are usually given, with a most appropriate selection, to illustrate this worse than trifling art—when, in order to prove that "John is a sinner," I do not adduce any particular sin of which he has been guilty, but draw up my accusation more irresistibly by the major of a syllogism—"All men are sinners;" "John is a man;" "therefore, John is a sinner." If I really attached any meaning to my major proposition, "all men are sinners," I must at that very moment have felt as completely that John was a sinner, as after I had persued him technically through the minor and conclusion

The great *error of the theory of the syllogism* con-

sisted in supposing that because all our knowledge may be technically reduced, in some measure, to general maxims, these maxims have naturally a prior and paramount existence in our thoughts, and give rise to those very reasonings which, on the contrary, give rise to them.

It is not on account of our previous assent to the maxim, "a whole is greater than a part," that we believe any particular whole to be greater than any part of it; but we feel this truth in every particular case by its own intuitive evidence, and the axiom only expresses briefly our various feelings of this kind without giving occasion to them. The general axiom, then, is in every case *posterior* to the separate feelings of which it is only the brief expression, or, at least, without which, as prior to our verbal statement of the axiom, the axiom itself never could have formed a part of our system of knowledge. The syllogism, therefore, which proceeds from the axiom to the demonstration of particulars, reverses completely the order of reasoning, and begins with the conclusion, in order to teach us how we may arrive at it.

The natural process of reasoning by two propositions instead of the three which the syllogism would force us to use, has been allowed indeed by logicians to have a place in their system; because, with all their fondness for their own technical modes, they had not sufficient hardihood to deny, that it is at least possible for us to reason *sometimes*, as in truth we *always* reason. Their only resource, therefore, was to reduce this natural process under their own artificial method, and to give it a name which might imply the necessity of this reduction, before the reasoning itself could be worthy of that honorable title. They supposed, accordingly, the proposition which was technically wanting to be understood

in the mind of the thinker or hearer, and termed the reasoning, therefore, an *enthymeme*. It was, they said, a *truncated* or imperfect *syllogism*. They would have expressed themselves more accurately if they had described their own syllogism, as, in relation to the natural *analytic* process of our thought, a cumbrous and *overloaded enthymeme*.

A very little attention to the nature of the different propositions of the syllogism, will be sufficient to show that the same fundamental error which renders it useless for discovering truth, renders it equally useless for the communication of it to others; and that as our internal reasoning is only a series of enthymemes, it is only by such a series of enthymemes as that by which truth unfolds itself to our own minds, that it can be successfully unfolded to the minds of others. In the attempt to communicate knowledge by the technical forms of reasoning, the major proposition, as already stated, must of course have been supposed to be understood and admitted when stated, since, if not admitted by the hearer or reader, as soon as stated, it would itself stand in need of proof; and if it was so understood and admitted, of what use would the remaining propositions of the syllogism be, since they could communicate no truth that was not communicated and felt before?

The whole question relates to the feeling of the truth of the major proposition; for if it be true, and felt to be true, all the rest is already allowed; and yet this most important of all propositions, which, if the conclusion be of a kind that demands proof, must itself demand proof still more, is the very proposition which is most preposterously submitted to us in the *first* place for our assent, without any proof whatever,—the honor of a proof being reserved only for a proposition which, if the major require no proof, must be itself too clear to stand

in need of it. Hence, the syllogism cannot fail to train the mind which receives instructions in this way, to two of the most dangerous, practical errors,—the errors of admitting without proof only what requires proof, and of doubting, that is to say, of requiring proof, only of what is evident.

The triumph of the syllogistic art, it must be confessed, however, is not as an art of acquiring or communicating truth, but as *an art of disputation*,—as the great art of proving any thing by any thing, *quidlibet per quodlibet probandi*. And, if it be a merit to dispute long and equally well on subjects known and unknown; to vanquish an opponent by being in the wrong, and sometimes too by being in the right, but without the slightest regard either to the right or wrong, and merely as these accidental circumstances may have corresponded with certain skilful uses of terms without a meaning,—this merit the logicians of the schools unquestionably might claim.

One of the most hurtful consequences of this system, was the ready disguise of venerable ratiocination which it afforded for any absurdity. However futile an explanation might be, it was still possible to advance it in all the customary solemnities of mood and figure; and it was very natural, therefore, for those who had heard what they had been accustomed to regard as reasoning, to believe that in hearing a reasoning they had heard a reason.

As another very hurtful consequence of this technical system, I may remark that the constant necessity of having recourse to some syllogistic form of argument, and of using these forms in cases in which the opinions, involved in the syllogism, were at least as clear before the syllogism as after it, rendered argument and belief, by a sort of indissoluble association, almost synonymous

terms. If we had still to prove *John* to be fallible after having proved, or at least obtained assent to the proposition that *all men* are fallible, it was not easy to discover any truth so self-evident as not to stand at least equally in need of demonstration. Hence the constant tendency in the scholastic ages to prove what did not stand in need of proof. Every thing was to be *demonstrated*, and every thing *was* demonstrated; though it must be confessed that the only effect of the demonstration frequently was to render obscure—at least as obscure as any thing self-evident could be rendered—what, but for the demonstration, could not have admitted of the slightest doubt.

Akin to this tendency of *proving* every thing—even self-evident propositions—by some *syllogistic* form, was the tendency which the mind acquired to apply many varieties of technical phraseology to the same proposition, so as to make many propositions of one, as if every repetition of it, in another form of language, were the enunciation of another truth. It is impossible to take up a volume of any of the old logicians, and to read a single page of it, without discovering innumerable examples of the influence of which I speak.

OF THE FUNCTIONS AND LOGICAL VALUE OF THE SYLLOGISM.

[Extracted from Mill's Logic, pp. 122–137.]

We have now to inquire *whether the syllogistic process*, that of reasoning from generals to particulars, *is, or is not, a process of inference; a progress from the known to the unknown;* a means of coming to a knowledge of something which we did not know before.

Logicians universally allow that a syllogism is vicious if there be any thing more in the conclusion than was assumed in the premises. But this is, in fact, to say

that nothing ever was, or can be, proved by syllogism which was not known, or assumed to be known, before. Is ratiocination, then, not a process of inference? And is the syllogism, to which the word reasoning has so often been represented to be exclusively appropriate, not really entitled to be called reasoning at all? This seems an inevitable consequence of the doctrine, admitted by all writers on the subject, that a syllogism can prove no more than is involved in the premises. Yet the acknowledgment so explicitly made, has not prevented one set of writers from continuing to represent the syllogism as the correct analysis of what the mind actually performs in discovering and proving the larger half of the truths, whether of science or of daily life, which we believe: while those who have avoided this inconsistency, and followed out the general theorem respecting the logical value of the syllogism to its legitimate corollary, have been led to impute uselessness and frivolity to the syllogistic theory itself, on the ground of the *petitio principii* which they allege to be inherent in every syllogism. As I believe both of these opinions to be fundamentally erroneous, I must request attention to certain considerations, without which any just appreciation of the true character of the syllogism, and the functions it performs in philosophy, appears to me impossible; but which seem to have been either overlooked, or insufficiently adverted to, both by the defenders of the syllogistic theory and by its assailants.

It must be granted that *in every syllogism, considered as an argument to prove the conclusion*, there is a *petitio principii*. When we say,

All men are mortal;
Socrates is a man;
Therefore, Socrates is mortal;

it is unanswerably urged by the adversaries of the syllogistic theory, that the proposition, "Socrates is mortal," is presupposed in the more general assumption, "All men are mortal:" that we cannot be assured of the mortality of all men, unless we were previously certain of the mortality of every individual man: that if it be still doubtful whether Socrates, or any other individual you choose to name, be mortal or not, the same degree of uncertainty must hang over the assertion, "All men are mortal:" that the general principle, instead of being given as *evidence* of the particular case, cannot itself be taken for true, without exception, until every shadow of doubt which could affect any case comprised with it, is dispelled by evidence from some other quarter; and then what remains for the syllogism to prove? that, in short, no reasoning from generals to particulars can, as such, prove any thing; since from a general principle you cannot infer any particulars but those which the principle itself assumes as foreknown.

This doctrine is irrefragable; and if logicians, though unable to dispute it, have usually exhibited a strong disposition to explain it away, this was not because they could discover any flaw in the argument itself, but because the contrary opinion seemed to rest upon arguments equally indisputable. In the syllogism last referred to, for example, or in any of those which we previously constructed, is it not evident that the conclusion may, to the person to whom the syllogism is presented, be actually and *bona fide* a new truth? Is it not matter of daily experience that truths previously undreamed of, facts which have not been, and cannot be, directly observed, are arrived at by way of general reasoning?

We believe that the Duke of W. is mortal. We do

not know this by direct observation, since he is not yet dead. If we were asked how, this being the case, we know the Duke to be mortal, we should probably answer, Because all men are so. Here, therefore, we arrive at the knowledge of a truth not (as yet) susceptible of observation, by a reasoning which admits of being exhibited in the following syllogism:

All men are mortal;
The Duke of W. is a man;
Therefore, the Duke of W. is mortal.

And since a large portion of our knowledge is thus acquired, logicians have persisted in representing the syllogism as a process of inference or proof; although none of them have cleared up the difficulty which arises from the inconsistency between that assertion and the principle, that if there be any thing in the conclusion which was not already asserted in the premises, the argument is vicious. For it is impossible to attach any serious scientific value to such a mere salvo, as the distinction drawn (by Whately and others) between being involved *by implication* in the premises, and being directly asserted in them.

From this difficulty there appears to be but one issue. The proposition that the Duke of W. is mortal, is evidently an inference; it is got at as a conclusion from something else; but do we in reality conclude it from the proposition, "All men are mortal?" I answer, No.

The *error* committed, is that of *overlooking the distinction between the two parts of the process* of philosophizing, *the inferring part and the registering part; and ascribing to the latter the functions of the former.*

Assuming that the proposition, "The Duke of W. is mortal," is immediately an inference from the proposition, "All men are mortal," whence do we derive our

knowledge of that general truth? No supernatural aid being supposed, the answer must be, by observation. Now all which man can observe are individual cases. From these all general truths must be drawn, and into these they may again be resolved; for a general truth is but an aggregate of particular truths; a comprehensive expression, by which an indefinite number of individual facts are affirmed or denied at once.

But a general proposition is not merely a compendious form for recording and preserving in the memory a number of particular facts, all of which have been observed. *Generalization is not a process of mere reasoning; it is also a process of inference.* From instances which we have observed, we feel warranted in concluding, that what we found true in those instances, holds in all similar ones, past, present, and future, however numerous they may be. We then, by that valuable contrivance of language which enables us to speak of many as if they were one, record all that we have observed, together with all that we infer from our observations, in one concise expression; and have thus only one proposition, instead of an endless number, to remember or to communicate. The results of many observations and inferences, and instructions for making innumerable inferences in unforeseen cases, are compressed into one short sentence.

When, therefore, we conclude from the death of John and Thomas, and every other person we ever heard of in whose case the experiment had been fairly tried, that the Duke of W. is mortal like the rest, we may indeed pass through the generalization, "All men are mortal," as an intermediate stage; but it is not in the latter half of the process, the descent from "all men" to the Duke of W. that the *inference* resides. The inference is finished when we have asserted that all

men are mortal. What remains to be performed afterwards is merely deciphering our own notes.

Archbishop Whately has contended that syllogism, or reasoning from generals to particulars, is not, agreeably to the vulgar idea, a particular *mode* of reasoning, but the philosophical analysis of *the* mode in which all men reason, and must do so if they reason at all. With the deference due to so high an authority, I cannot help thinking that the vulgar notion is, in the present case, the more correct. If, from an experience of John, Thomas, &c., who once were living, but are now dead, we are entitled to conclude that all human beings are mortal, we might surely, without any logical inconsequence, have concluded at once from those instances that the Duke of W. is mortal. The mortality of John, Thomas, and company is, after all, the whole evidence we have for the mortality of the Duke of W. Not one iota is added to the proof of interpolating a general proposition. Since the individual cases are all the evidence we can possess, evidence which no logical form into which we choose to throw it can make greater than it is; and since that evidence is either sufficient in itself, or, if insufficient for one purpose, cannot be sufficient for the other; I am unable to see why we should be forbidden to take the shortest cut from these sufficient premises to the conclusion, and constrained to travel the "high *priori* road" by the arbitrary fiat of logicians.

Not only *may* we reason from particulars to generals, but we perpetually do so reason. All our earliest inferences are of this nature. From the first dawn of intelligence we draw inferences, but years elapse before we learn the use of general language. The child who, having burned his fingers, avoids to thrust them again into the fire, has reasoned or inferred, though he has

never thought of the general maxim, "Fire burns." He knows from memory that he has been burnt, and on this evidence believes, when he sees a candle, that if he puts his finger into the flame of it he will be burnt again. He believes this in every case which happens to arise, but without looking, in each instance, beyond the present case. He is not generalizing; he is inferring a particular from particulars.

I believe that, in point of fact, when drawing inferences from our personal experience, and not from maxims handed down to us by books or tradition, we much oftener conclude from particulars to particulars directly, than through the intermediate agency of any general proposition. We are constantly reasoning from ourselves to other people, or from one person to another, without giving ourselves the trouble to erect our observations into general maxims of human or external nature. When we conclude that some person will, on some given occasion, feel or act so and so, we sometimes judge from an enlarged consideration of the manner in which men in general, or men of some particular character, are accustomed to feel and act; but much oftener from having known the feelings and conduct of the same man in some previous instance, or from considering how we should feel or act ourselves.

From the considerations now adduced, the following conclusions seem to be established. *All inference is from particulars to particulars.* *General propositions* are merely *registers of such inferences already made, and short formulæ for making more.* The major premise of a syllogism, consequently, is a formula of this description: and the conclusion is not an inference drawn *from* the formula, but an inference drawn *according to* the formula: the real logical antecedent, or

premises, being the particular facts from which the general proposition was collected by induction.

This view of the functions of the syllogism is confirmed by the consideration of precisely those cases which might be expected to be least favorable to it, namely, those in which ratiocination is independent of any previous induction. We have already observed that the syllogism, in the ordinary course of our reasoning, is only the latter half of the process of travelling from premises to a conclusion. There are, however, some peculiar cases in which it is the whole process. Particulars alone are capable of being subjected to observation, and all knowledge which is derived from observation, begins therefore, of necessity, in particulars; but *our knowledge may, in cases of a certain description, be conceived as coming to us from other sources than observation.* It may present itself as coming *from revelation;* and the knowledge, thus supernaturally communicated, *may be conceived to comprise not only particular facts, but general propositions*, such as occur so abundantly in the writings of Solomon and in the apostolic epistles. *Or the generalization may not be*, in the ordinary sense, *an assertion at all, but a command:* a law, not in the philosophical, but in the moral and political sense of the term: an expression of the desire of a superior, that we, or any number of other persons, shall conform our conduct to certain general instructions.

In both these cases the generalities are given to us, and the particulars are elicited from them by a process which correctly resolves itself into a series of syllogisms. The real nature, however, of the supposed deductive process, is evident enough. It is a search for truth, no doubt, but through the medium of an inquiry into the meaning of a form of words. *The only point to be*

determined is, *whether the authority which declared the general proposition, intended to include this case in it; and whether the legislator intended his command to apply to the present case among others, or not.* This is a question, as the Germans express it, of hermeneutics; it relates to the meaning of a certain form of discourse. The operation is *not a process of inference, but of interpretation.*

In this last phrase we have obtained an expression which appears to me to characterize, more aptly than any other, *the functions of the syllogism* in *all* cases. *When the premises are given by authority, the function of reasoning is to ascertain the testimony of a witness, or the will of a legislator, by interpreting the signs in which the one has intimated his assertion, and the other his command.*

In like manner, *when the premises are derived from observation, the function of reasoning is* to ascertain what we (or our predecessors) formerly thought might be inferred from the observed facts, and to do this by interpreting a memorandum of ours or of theirs. The memorandum reminds us, that from evidence more or less carefully weighed, it formerly appeared that a certain attribute might be inferred wherever we perceive a certain mark. The proposition, "All men are mortal" (for instance), shows that we have had experience from which we thought it followed that the attributes connoted by the term "man," are a mark of mortality. But when we conclude that the Duke of W. is mortal, we do not infer this from the memorandum, but from the former experience. All that we infer from the memorandum is our own previous belief (or that of those who transmitted to us the proposition) concerning the inferences which that former experience would warrant.

In the above observations it has, I think, been clearly shown, that, although there is always a process of reasoning or inference where a syllogism is used, the syllogism is not a correct analysis of that process of reasoning or inference; which is, on the contrary (when not a mere inference from testimony), an inference from particulars to particulars; authorized by a previous inference from particulars to generals, and substantially the same with it; of the nature, therefore, of induction. But while these conclusions appear to me undeniable, I must yet enter a protest, as strong as that of Archbishop Whately himself, against the doctrine that the syllogistic art is useless for the purposes of reasoning. The reasoning lies in the act of generalization, not in interpreting the record of that act; but *the syllogistic form is an indispensable collateral security for the correctness of the generalization itself.*

It has already been seen, that if we have a collection of particulars sufficient for grounding an induction, we need not frame a general proposition: we may reason at once from those particulars to other particulars. But it is to be remarked withal, that *whenever*, from a set of particular cases, *we can legitimately draw any inference, we may legitimately make our inference a general one.* If, from observation and experiment, we can conclude to one new case, so we may to an indefinite number. If that which has held true in our past experience will therefore hold in time to come, it will hold not merely in some individual case, but in all cases of a given description. Every induction, therefore, which suffices to prove one fact, proves an indefinite multitude of facts; the experience which justifies a single prediction, must be such as will suffice to bear out a general theorem.

This throwing of the whole body of possible infer

ences from a given set of particulars *into one general expression, operates as a security for their being just inferences* in more ways than one. *First*, a process of thought which leads to a comprehensive generality is felt to be of greater importance than one which terminates upon an insulated fact, and the mind is, therefore, led to weigh more carefully the sufficiency of the experience appealed to, for supporting the inference grounded upon it. *Secondly*, if, instead of concluding straight to the particular case, we place before ourselves an entire class of facts, the whole contents of a general proposition, every tittle of which is legitimately inferrible from our premises, if that one particular conclusion is so; there is then a considerable likelihood that if the premises are insufficient, and the general inference therefore groundless, it will comprise within it some fact or facts the reverse of which we already know to be true; and we shall *thus discover the error in our generalization*, by what the schoolmen term a *reductio ad impossibile.*

Thus, if during the reign of Marcus Aurelius, a subject of the Roman empire, under the bias naturally given to the imagination and expectations by the lives and characters of the Antonines, had been disposed to conclude that Commodus would be a just ruler; supposing him to stop there, he might only have been deceived by sad experience. But if he reflected that this conclusion could not be justifiable unless from the same evidence, he was also warranted in concluding some general proposition, as, for instance, that all Roman emperors are just rulers; he would immediately have thought of Nero, Domitian, and other instances, which, showing the falsity of the general conclusion, and therefore the insufficiency of the premises, would have warned him that those premises could not prove,

in the instance of Commodus, what they were inadequate to prove in any collection of cases in which his was included.

The advantage, in judging whether any controverted inference is legitimate, of referring to a *parallel case*, is universally acknowledged: but, by ascending to the general proposition, we bring under our view not one parallel case only, but all possible parallel cases at once; all cases to which the same set of evidentiary considerations are applicable.

When, therefore, we argue from a number of known cases to another case supposed to be *analogous*, it is always possible, and generally advantageous, to divert our argument into the circuitous channel of an induction from those known cases to a general proposition, and a subsequent *application of the general proposition to the unknown case.*

The value, therefore, of the syllogistic form, and of the rules for using it correctly, does not consist in their being the form and the rules according to which our reasonings are necessarily or even usually made; but in their furnishing us with a mode in which those reasonings may always be represented, and which is admirably calculated, if they are inconclusive, to bring their inconclusiveness to light. An induction from particulars to generals, followed by a syllogistic process from those generals to other particulars, is a form in which we may always state our reasonings, if we please. It is not a form in which we *must* reason, but it is a form in which we *may* reason, and into which it is indispensable to throw our reasoning, when there is any doubt of its validity; though, when the case is familiar, and little complicated, and there is no suspicion of error, we may, and do, reason at once from the known particular cases to unknown ones.

These are the uses of the syllogism, *as a mode of verifying any given argument.* Its *ulterior uses*, as respects the general course of our intellectual operations, hardly require illustration, being, in fact, the acknowledged uses of general language. They amount substantially to this, that the inductions may be made once for all: a single careful interrogation of experience may suffice, and the result may be registered in the form of a general proposition which is committed to memory or to writing, and from which afterwards we have only to syllogize. *Though not necessary to reasoning, general propositions are necessary to any considerable progress in reasoning.* It is therefore natural and indispensable to separate the process of investigation into two parts, and obtain general formulæ for determining what inferences may be drawn, before the occasion arises for drawing the inferences. The work of drawing them is then that of applying the formulæ; and the rules of the syllogism are a system of securities for the correctness of the application.

Although, therefore, all processes of thought in which the ultimate premises are particulars, whether we conclude from particulars to a general formula, or from particulars to other particulars according to that formula, are equally *induction;* yet this name more peculiarly belongs to the process of establishing the general proposition, and the remaining operation, which is substantially that of interpreting the general proposition, usually bears the name of *deduction.* Every process by which any thing is inferred respecting an unobserved case, consists of an induction followed by a deduction; and although the process need not necessarily be carried on in this form, yet it is always susceptible of the form, and must be thrown into it when assurance of scientific accuracy is needed and desired.

INDUCTION AND DEDUCTION.

[From Thomson's Laws of Thoughts.]

INDUCTION is usually defined to be the process of drawing a general law from a sufficient number of particular cases. Deduction is the converse process of proving that some property belongs to a particular case, from the consideration that it comes under a general law. More concisely, induction is the process of discovering laws from facts, and causes from effects; and deduction that of deriving facts from laws, and effects from their causes. For example, that all bodies tend to fall toward the earth is a truth which has been obtained by considering a number of bodies where that tendency has been displayed by induction; if from this general principle we argue that the stone we throw from our hands will show the same tendency, we deduce. If it were always possible duly to examine all the cases to which a law applies, and to see by intuition the significant and important parts of each, the process of induction would be simple enough; but a complete inspection of all the cases is very seldom possible. Even the laws on whose invariable operation the strongest reliance is placed, must have been laid down upon the evidence of a number of cases very limited when compared with the whole; that men must all die, and that heavy bodies tend to fall toward the earth, are statements which no one can boast of having verified by enumeration. The perfect certainty with which they are believed, rests upon far less than the millionth part of the cases that might be brought to bear witness about them. Nor, again, are the signif-

icant and essential circumstances easy to observe, in the few cases that lie within the reach. Either they escape notice altogether, as did the fact of the earth's revolution in the early days of astronomy; or they are so entangled or overlaid with a mass of other facts, that their importance does not at first appear, like the action of cold in the production of dew, before Dr. Wells' observations. It appears, then, that the pure inductive syllogism, that argument by which a law is laid down as the exact sum of all the single cases, will not suffice for scientific research. § 115.

While *pure* logic* only treats of arguments that are certain and irrefutable, the most important duty of *applied* logic is to determine under what conditions imperfect arguments, such as the example, the imperfect induction, the deduction from a proposition that is not truly universal, and some of the rhetorical enthymemes, can be fairly employed; and to show that though these weaker forms are so many deviations from a perfect demonstrative argument, they are so far from superseding the perfect forms, that in reality each of them appeals to and attests the cogency of some perfect form, to which it strives, as it were, to conform itself.

Every one is perfectly certain of the truth of the proposition, that men grow infirm and die; of which we have been convinced partly by our own experience of men, and partly by the experience of others, delivered to us from all quarters, in the sober pages of the moralist, as well as in the reckless lyrics of the reveller. Nor does our conviction of this truth permit itself to

* *Pure* logic is defined to be the science of the necessary laws of thought *in their own nature; applied* logic, the science of the necessary laws of thought as *employed in attaining truth*

be disturbed by the consideration, which is likewise undeniable, that the whole aggregate of this experience does not in itself warrant any statement having *all* mankind for its subject; that even supposing the decadence and death of every man in times past had been obscured, which is utterly inconceivable, at any rate there are many now living upon whom the common doom has not passed, and whose cases, therefore, cannot enter into the sum of our experience. In a word, we have concluded from an experience that *many* men have become infirm and died, the much wider truth that *all* men do so; and this is unwarrantable in the given case, and we are right in rejecting upon the faith of it an assertion, unless supported by evidence that transcends experience, that one man has not died, such as we have in the fable of the Wandering Jew, or a proposal to obviate death in future, such as was involved in the search of the alchemist for an elixir of life.

But that this mode of argument, from a particular to a universal, from *some* to *all*, is not valid in itself, is evident from applying it to another case, in which it is absurdly false: "some men are tall, therefore all men are tall;" and the only form perfectly indisputable in itself would be, "the men whom we have observed, have all died, and these men are all men, that is, the only men, therefore all men die," which, from the nature of this case, cannot be employed. But applied logic first shows that this perfect argument is the measure of the validity of the other; that our conclusion is only true, if we can say, not, indeed, "these men are all men," which is impossible, but the equally *general* proposition, "these men are (*as good as*) all men," thus conforming really to the perfectly conclu-

sive argument; and next, here and under what circumstances we can conform the incomplete to the complete enumeration, how *some* can ever be said to be as good as *all* for purposes of argumentation. § 5.

COMPLETE AND INCOMPLETE INDUCTION.

The question demands an answer—on what principle are incomplete inductions, *i. e.*, examinations of facts that stop short of complete enumeration, sufficient to establish general laws? The answer will contain the most interesting and important of the principles of logic. All our experience teaches us that in the universe, the "cosmos," whose very name means order, regularity and uniformity prevail, and caprice and uncertainty are excluded. While it is conceivable that any one of the natural laws in which we place most confidence might be reversed, while it is certain that many of them have been miraculously suspended for purposes proportionably great and important, our present belief in their permanence is almost unlimited. The thought that there might be no more daylight, if our planet ceased to revolve while one side of it was averted from the sun—that a draught from the spring would to-day destroy the life which it recruited yesterday—that a stone thrown from the hand would remain suspended in mid-air, instead of falling, never enters our minds, except, perhaps, as an amusing fancy; yet each of these things is formally possible. Our confidence in the uniformity of natural laws is embodied in the canon, that "under the same circumstances and with the same substances, the same effects always result from the same causes."

This great inductive principle is itself proved by in-

duction, and partakes of the same formal defect that may be charged against other inductive results, viz., that its terms are wider than our experience can warrant. Many groups of facts, connected as causes and effects, have not been examined; and in them it is conceivable, at least, that there may be capricious causes producing opposite effects at different times. If this were otherwise—if the canon were the result of a simple enumeration of all possible cases—its present value as a rule would disappear, since it is to unknown and unexamined cases that we chiefly wish to apply it. We draw a universal canon from an experience less than universal, and then employ it to justify us in drawing other universal truths from other particular experiences.

The difficulty, however, in applying this canon is to discover the existence of a law of nature in any set of facts, and how far the interference of other laws permits it to operate. And here the relation between deduction and induction, between synthesis and analysis, is of great service. These pairs of terms correspond exactly, as names for the same two processes; but induction and deduction give prominence to the law, analysis and synthesis to the fact. Thus we call the law of gravitation an inductive law, and speak of deductions from it, thinking more, in both cases, of the universal than of the particular cases it referred to. But we analyze a fact or a substance, and make a synthesis (a *placing together* of elements) to reproduce the fact or substance. Using the two former names, the universal, the law, the world of conceptions, the abstract is made prominent; using the two latter, we give prominence to the single case, the phenomenon, the world of the senses, the concrete. The supposed gen-

eral principle may be tried by applying it to a new particular case; the analysis of a fact into its elements may be tested by putting the elements together anew, and seeing if the fact is reproduced; the correctness of the observations may be confirmed by careful experiment. And such attempts offer a two-fold advantage. If, on applying some general principle of which we are still uncertain to a new particular case, we find that it helps to explain the particular, this is one fruit of the process; and another is, that our confidence in the general principle is materially strengthened. Law explains fact; fact confirms law. And after this alternate ascent and descent has been a few times put forward, our belief in the correctness of its results is quite complete.

A correct induction furnishes the premise for a sound deduction, and a doubtful induction must be verified by deductions from it. The law that the planets are retained in their orbits by an attractive force that varies inversely as the square of their distance from the sun, has been worked out to its theoretical results, and these have been compared, synthetically, with the known facts. Theory was found not to correspond in all respects, and thus it became necessary to revise the analysis, and discover the residual causes that produced the variations, which astronomers have succeeded in doing.

By a mutual co-operation, then, of these two processes, the physical sciences are advanced. If no attempts were made to draw a conclusion, and see what use could be made of it till grounds formally complete were before us, conclusions would never be drawn. The certainties by which the chemist, the astronomer, the geologist conducts his operations with

composure and success, were once bare possibilities, which, after being handed back and forward between induction and deduction, turned out to be truths.

THE SYLLOGISM BOTH DEDUCTIVE AND INDUCTIVE.

It is a great misfortune for logic that the syllogism has been regarded as an instrument for deduction only. An error of Aristotle's, for the correction of which his many-sided mind has itself supplied hints, has been tenaciously preserved; and according to it, four modes of syllogism, in which we start from a general law as our main premise, have been regarded as the only perfect forms; and opinions have been pronounced upon the whole syllogistic system from these four specimens. We need not wonder, then, that modes only adapted for teaching truth have been pronounced useless for discovering it; that when deductive arguments are selected, it should be easy to prove that they will not do the work of inductive. But it is wonderful that so few should have perceived how absurd were the attempts to turn the so-called imperfect modes into perfect ones.

The difficulty in answering the question, how does logic aid by the syllogism in adding to our stock of knowledge? has been caused principally by studying only the complete forms of the syllogism; whereas, in discoveries it is necessary to accept defective forms, only suspending our adoption of them until they are fortified by other evidence. The fact that such suspense is necessary, proves that the forms are imperfect; the fact that we have attained new truths from evidence formally insufficient to establish them by itself, proves their usefulness.

THE SOCRATIC METHOD OF REASONING.

[We subjoin, as worthy of a place in a work on logic, the following account (from a London publication) of the method of reasoning practised by the great Athenian sage. For additional illustrations or examples of this most effective and lucid method of reasoning, the reader may refer to "Xenophon's Memorabilia of Socrates."]

This method of disputation derives its name from Socrates, by whom it was practised, and by other philosophers in his time, long before Aristotle invented the forms of syllogism in mode and figure, formerly used in scholastic disputation.

A dispute in the Socratic manner is carried on *by way of question and answer*, representing the form of a dialogue or common conversation, wherein the person who instructs seems to be the inquirer, and seeks information from him who is instructed.

If the person with whom we argue makes use of obscure or ambiguous words, we must ask him to explain his meaning; for it often happens that men have accustomed themselves to some words or phrases which they do not perfectly understand; and then by a few modest questions they will much better discern their ignorance than by a direct opposition, which often raises the passions and shuts the door against conviction. When we have gone thus far, if the person be a sincere lover of truth, he will presently acknowledge that he did not sufficiently understand the matter, and then the dispute is at an end. But if he is obstinate, and will obtrude his words upon us without defining them, we ought to proceed no further till he has satisfied us what he means. We must press him with little questions, as if we were dull of apprehension and would

be glad to understand him better. But if we can by no means prevail with him to speak plainly, it is time to put an end to the dispute, since it is evident he knows not what he would be at, or has a mind only to wrangle.

If at last we bring him to declare his meaning clearly, we then proceed to ask him questions upon the several parts of the doctrine he advances and their consequences, not as objecting against them, but for the sake of better information. From these questions, if proposed with dexterity, it will easily appear whether the doctrine be absurd or not; and to make the matter still clearer, it will be proper to use examples and similitudes. But if this be not sufficient to show the falsity of the opinion, we must inquire of the person on what arguments or proofs he grounds it, and then pursue the same conduct as we did in the first part of the dispute. Thus the learner will be led into the knowledge of truth as it were by his own invention, and being drawn by a series of pertinent questions to discern his own mistakes, he will more easily be induced to relinquish them, as he seems to have discovered them himself.

AN EXAMPLE OF THIS METHOD OF DISPUTATION.

Suppose M. would lead N. into the belief of a future state of rewards and punishments, it might be done in the following easy manner of reasoning.

M. Did God make the world?

N. Certainly he did.

M. Does God govern the world?

N. As he made it, 'tis reasonable to suppose he governs it.

M. Is not God a *good* and *righteous* governor?

N. Doubtless he is.

M. What is the true idea of a *good* and *righteous* governor?

N. That he *punishes the wicked*, and *rewards the good.*

M. But are the wicked always punished in this life?

N. No, every one's observation tells him the contrary; for the worst of men are often advanced to riches and honor, and have all the external comforts that the world affords.

M. Are the good always rewarded in this life?

N. No, certainly; for poverty, persecution, and various kinds of affliction, are often the lot of the most virtuous men.

M. How then does it appear that God is *good* and *righteous?*

N. I confess there is but little appearance of it in the present state of things.

M. Will there not be a time when the scene of things will be changed, and God will make his goodness and righteousness in the government of mankind appear?

N. Undoubtedly such a time will come.

M. But if this be not done before death, how can it be done at all?

N. In no other way that I can think of, but by supposing man to have some existence after this life.

M. Then you are convinced that there must be a state of rewards and punishments beyond the grave?

N. Yes, I am thoroughly persuaded of it; since the goodness and righteousness of God, as governor of the world, cannot be made to appear without it.

This method of reasoning, though it has been long neglected, is certainly a natural and pleasing manner of instruction, and is much more agreeable to that candor and sincerity which every honest man ought to propose.

than the *art of wrangling* which for several ages prevailed in the schools, and tended to overspread the minds of youth with darkness and uncertainty, and to retard or mislead them in their inquiries after truth.

ARRANGEMENT OF A SCIENCE.

[From Thomson's Laws of Thought.]

Subordinate Parts of a Science.

Judgments that relate to speculation only, are called theoretical; those which refer to practice are practical. Judgments that require or admit of proof, are called demonstrable; those which are manifest from the very terms, are indemonstrable. Thus much being premised, we can define certain subordinate parts of a science.

An *Axiom* is an indemonstrable, theoretical judgment. A *Postulate* is an indemonstrable, theoretical judgment. A *Theorem* is a demonstrable, theoretical judgment. A *Problem* is a demonstrable, practical judgment. A *Thesis* is a judgment proposed for discussion and proof (but with Aristotle it sometimes means an axiom of some special science or disputation). An *Hypothesis* is a judgment provisionally accepted as an explanation of some group of facts, and is liable to be discarded if it is found inconsistent with them. A judgment which follows immediately from another, is sometimes called a *Corollary* or Consectary. One which does not properly belong to the science in which it appears, but is taken from another, is called a *Lemma*. One which illustrates the science where it appears, but is not an integral part of it, is a *Scholion*.

A Division of the Sciences.

A division of the sciences tends to separate different districts of knowledge, with the conceptions that belong to them, from one another. It is desirable to attempt such a division, as the conclusion of a treatise on Logic; if for no other reason, in order that we may know to how many subjects we may have to direct our rules.

A science is a systematic arrangement of all the laws which belong to any one subject. The three great fields of human research are,—the Divine Nature, the nature of the human mind, and the nature of the universe; and corresponding to them are three principal groups of sciences—the Theological, the Psychological, and the Cosmical or Natural.

Theological Sciences.

Theology.	Biblical,	Biblical Criticism. Exposition—Exegesis.
	Systematical.	Dogmatic Theology. Pastoral Theology.
	Historical.	Church History. History of Doctrines.

Mental Sciences.

Mental Sciences.	Reason.	Logic, or the Science of the forms of Thought. Metaphysic, which examines the ground of all knowledge of things.
	Choice and Affection.	Morality, founded on the conception of Right. Æsthetic, founded on the conception of Beauty.

Cosmical Sciences.

Mathematical Sciences.	Pure Mathematics.	Arithmetic. Geometry.
	Physico Mathematics.	Mechanics. Astronomy.
Physical Sciences.	Physics proper.	General Physics. Technology, or Physics applied to Arts and Manufactures.
	Geology.	Descriptive Geology. Mining, or "Oryctotechny."
Natural Sciences.	Phytological.	Botany. Agriculture.
	Zoological.	Zoology proper Zootechny, knowledge of the use of animals to man.

Medical Sciences.	Physico Medical.	Medical Physics.
		Hygiene.
	Medical Science proper.	Pathology.
		Practical Medicine.
Political Sciences.	Legislation.	Political Economy.
		History of Laws and Constitutions.
	Government.	Administration of Law.
		Police and Defence.
Palæological Science.	Of the Earth.	Historical Geology.
		Distribution of Plants and Animals.
	Of the Human Race.	Glossology, or Science of affinity of Languages.
		Ethnography, or Science of affinity of Races.

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