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ART. I. RECENT IMPROVEMENTS IN FORMAL LOGIC IN
GREAT BRITAIN.

By JAMES McCOSH, LL. D., Professor in Queen's College, Belfast, Ireland.

If we look back half a century we find Formal Logic taught in nearly all the colleges of Great Britain and Ireland, but exercising an influence infinitely less than nothing (to use a phrase of Plato's) on the thought of the country. Some of the professors and tutors were expounding it in a dry and technical manner, which wearied young men of spirit, and bred a distaste for the study: while others adopted an apologetic tone for occupying even a brief space with so antiquated a department, and threw out hints of a new Logic as about to appear and supersede the old. The lingering life maintained by that old Aristotelian and Scholastic Logic, in spite of the ridicule poured upon it by so many of the fresh thinkers of Europe for two or three centuries after the revival of letters, is an extraordinary fact in the history of philosophy: I believe it can be explained only by its containing substantially the correct analysis of the process which passes through the mind in reasoning. Certain it is that no proffered logical systems have been able to set aside the Aristotelian, whether devised by Ramus, by the school of Descartes, the school of Locke, or the school of Condillac: all have disappeared after creating a brief expectation followed by final disappointment. It is a

remarkable circumstance that the revived taste for logical studies in our age has proceeded from a restoration of the old Logic by two distinguished men, both reformers in their way, but both devoted admirers of the analysis of Aristotle. I need scarcely say, I refer to Dr. Whately and Sir W. Hamilton.

Whately first gave his views to the public in an article in the *Encyclopedia Metropolitana*, which was expanded into his *Elements* in 1826. The publication constitutes an era in the history of the study in Great Britain. The admirable defence of the old Logic against the objections of such men as Principal Campbell and Dugald Stewart, and still more the fresh and apt examples substituted for the dry stock ones, which had been in use for a thousand or two thousand years, speedily attracted the favorable attention of the fresh thinkers of the age; and Aristotle was once more in the ascendant. But while Whately's *Elements* is an interesting and a healthy work, it can scarcely be described as specially a philosophic one. In order to complete the reaction, another thinker had to appear and subject the whole science to a critical examination fitted to satisfy the deeper philosophic mind of the country. It is a curious circumstance that Hamilton uttered his first oracular declarations in a severe article on Whately in the *Edinburgh Review* (1833) published afterwards in his *Discussions*. He embraced the opportunity to bring forth the result of his logical researches, and specially to introduce to Great Britain the Logic which had sprung up in Germany out of Kant's *Critick of Pure Reason*. Since that date Logic has had a greater amount of interest collected round it in Great Britain than any other mental science, and has become incorporated with the freshest and brightest thought of the country. The interest in the study has been increased by the *Logic* of Mr. J. S. Mill, who has evidently felt the influence of Whately in the respect which he pays to Formal Logic; but adheres as a whole to the principles of his father, Mr.

James Mill, introducing some thoughts from the cognate Positive Philosophy of M. Comte. Mr. Mill, however, has given an impulse to the study, not by the portion of his work which treats of Formal Logic—which is not of much scientific value, but by his admirable exposition of the Logic of Induction. I have reviewed in a separate work the Logic of Mr. Mill. In this article I am to notice the modifications which have been introduced by Sir W. Hamilton, Dr. Mansel, and Archbishop Thomson.

Hamilton is entitled to be regarded as the author of the "New Analytic" as he calls it, after the Old Analytic or syllogistic analysis of the reasoning process unfolded in the *Prior Analytics*. But he has had powerful coadjutors in the two eminent men I have named: both of whom have evidently drawn from the same German sources as Hamilton; and both of whom have a fountain within in their own independent thought. Mansel is endowed with an acumen equal to that of the *Doctor Subtilis* or any other of the Schoolmen; and is possessed of an erudition not surpassed by that of any other German scholar. *Thomson's Outlines of the Laws of Thought* contains a clear and masterly exposition of the science which no doubt helped to raise him in comparatively early age to the high office which he now holds. And here I am tempted to remark that the Church of England has much credit in the way in which she has rewarded those of her sons who distinguish themselves in the higher walks of thought and scholarship. She gave Butler, the great ethical philosopher, her richest bishopric, that of Durham, and in our day she has made two of our great logical writers Archbishops, the one of Dublin, the other of York. It would be for their own benefit, and for the benefit of learning, were unendowed churches, whether in Britain or America, to imitate her in this respect, and not only encourage popular gifts but provide high places for those sons of theirs who betake themselves to the upper walks of literature and science, philosophy and theology.

But turning from this digression, I am bound in honesty to say that the clearest and in every way the most perfect and satisfactory account of the new Logic is to be found, not in Hamilton's own Lectures, which were left in a crude state, nor in the works of Thomson and Mansel, but in the Logic of Professor Bowen of Harvard College, U. S.*

The New Analytic proceeds directly or indirectly from the philosophy and Logic of Kant. Not that it is to be found in the works of Kant, but it is largely grounded on the peculiar metaphysics of the Critick of Pure Reason: it rose out of the searching criticism to which Kant had subjected the forms of the Old Logic: and it ramified directly from the logical treatises of such men as Esser and Krug, who belonged to the school. At the same time the system as a whole is an original one, the architect being Hamilton, and the others, builders along with him. It has a composite appearance, being in fact of a composite character, resembling the renovations we see in our country of medieval buildings, the old and the new adapted to each other with wonderful skill, but with all the while an incongruity forcing itself at times on the notice of the careful observer. I am not convinced that all the parts are likely to be preserved in the shape they now have, or that the Analytic always gives us the ultimate expression of the laws of thought: but I am sure that it is a valuable accession to the science. Altogether independent of its positive improvements, it has done great service by the careful examination to which it has subjected the Old Logic, which has come so creditably out of the trial. Forms which had become venerable, and, I may add, stiff from age, and which were inclined to stand on their dignity and acknowledged authority, have been obliged to submit to a sifting scrutiny, which may have shorn

*It is not my office to criticise the logical treatises of the United States: in fact I have not a complete collection of them. I observe in some of them, such as Atwater's excellent Manual of Elementary Logic, a disposition to unite the real improvements of the New Analytic with the established truths of the old Logic.

them of some of their ridiculous pretensions, but has at the same time delivered them from the dry dust which had gathered around, and threatened to bury them. The New Analytic having been before us for an age in a half-developed, and for half an age in a fully developed form, the time has now come for subjecting it to a critical examination, in order to determine what is true and valuable and worthy of being retained; what is imperfect and capable of improvement; and what is to be rejected as being fallacious or mistaken. I hope that out of these discussions there will arise a farther improved Logic founded on that of Aristotle, of the Scholastics, and the various technical works of the seventeenth centuries; embracing all that is valuable in the Kantian and Hamiltonian reformations: but with a freshness and an adaptation to the thought of the age, like the Logic of Whately. There is certainly room for such a work.

The defects and errors of the new Logic are derived from its German paternity. It is infected throughout with the metaphysics of Kant, from which it will require to be delivered before it is deserving of acceptance. It every where presupposes or implies that there are Forms in the mind, which it imposes on objects as it contemplates them: and it makes the science altogether *a priori*, and to be constructed apart from, and independent of, experience and observation. Hamilton quotes (*Logic*, Lect. iv.) Esser with approbation: "It is evident that in so far as a form of thought is necessary, this form must be determined or necessitated by the nature of the thinking subject itself. * * * The first condition of a form of thought is, that it is subjectively, not objectively, determined." This fundamental error (for so I reckon it) runs through the whole system, and injures and corrupts the valuable truth to be found in the Logic of Hamilton. I acknowledge that there are principles or laws in the mind, original and native: but these do not superinduce or impose forms on objects as we look at them: they simply enable us to perceive

what is in the objects. True, there are *a priori* laws in the mind operating prior to experience: but we can discover their nature and give an accurate expression of them only by means of careful observation. The science of Logic, as the science of the Laws of Discursive Thought, is to be constructed only by a careful inductive investigation of the operations of the human mind as it is employed in thinking. I am in this paper to inquire how far the supposed improvements found in the Logic of the School are in agreement with the actual processes of the mind in its Notions, Judgments, and Reasonings.

I. THE LOGICAL NOTION.

This is the logical topic, most requiring (as it appears to me) to be cleared up. Of late years much attention has been paid to Judgment and Reasoning, and comparatively little to what is involved in Simple Apprehension, the product of which, as it considers objects, I call the Notion. I am convinced that when the nature of the Notion is thoroughly unfolded it will virtually settle for us the still disputed questions as to the further processes of Judgment and Reasoning.

On one point alone under this head has Hamilton given us an addition to Logic. He has explicated more fully and elaborated more carefully than had ever been done before the distinction between the Extension and the Intension or comprehension of the Notion. Otherwise I do not think he has thrown any light on this part of Logic which furnishes the key to open the other and inner compartments. His views are thoroughly Kantian: he proceeds on the idea that the mind in its conception of objects has forms of its own which it imposes on what it contemplates. Farther, he acknowledges, in his logical construction only one kind of Notion, the General Notion, what he calls the Concept; thus overlooking two other species of Notions, what he calls the Singular Concrete and the Abstract. It will be necessary to look at these

two, as the more simple, before we consider the General Notion or Universal.

(1.) *The Singular Concrete Notion.* This is the simple apprehension of objects whether made known by the simple cognitive powers, such as Sense-Perception and Self Consciousness, or by the Reproductive Powers, such as Memory and Imagination. The object is apprehended as *singular*, or one thing; and as *concrete*, that is, an object with its qualities. Such is the knowledge or idea we have of an external object before our senses, or remembered, say, of this man or that mountain, or of ourselves or others in a certain state, say as thinking or conversing. I acknowledge that in the formation of this notion there is no exercise of discursive thought: the whole is the work of immediate perception or intuition. Still, it is the apprehension with which the mind starts, and which furnishes the materials out of which every other is fashioned. Farther, it comes into discursive thought, when we compare any singular notion, say "Hamilton," with a general notion, say "logician," and affirm that "Hamilton was a logician." It ought therefore to be considered in the evolution of the science. Hamilton has not inquired specially into its nature. Instead of regarding the singular concrete notion as arising simply on the contemplation of single objects, with their aggregate of qualities, Kant makes the mind from its own store of forms, give a unity to the scattered qualities; and Hamilton proceeds on the same supposition. At times indeed he has a glimpse of the true doctrine, but he never states it precisely. He says (*Metaph. Lect. xxvii.*) that we are "at once and primarily percipient of masses;" and (*Logic, Lect. xii.*) that "all objects are presented to us in complexity;" and that their characters are "originally known to us in their vague or confused totality." The true doctrine is, that we are primarily percipient of single objects in the concrete, that is, with their qualities as presented to us.

(2.) *The Abstract Notion;* that is, the notion of a part as

a part, more technically of an attribute of an object. The account given by Hamilton in his *Metaphysics* (Lect. xxxv.) is fair enough: "We can rivet our attention on some particular mode of a thing, as its smell, its color, its figure, its size, etc., and abstract it from the others. This may be called Modal Abstraction. The abstraction we have now been considering is performed on individual objects and is, consequently, particular [singular?]. There is nothing necessarily connected with generalization in Abstraction; Generalization is indeed dependent on Abstraction which it supposes; but abstraction does not involve generalization. I remark this because you will frequently find the terms abstract and general applied to notions used as convertible." He then quoted D. Stewart, who says: "A person who had never seen but one rose might yet have been able to consider its *color* apart from its other qualities; and therefore there may be such a thing as an idea which is at once abstract and particular." This account is satisfactory, as showing that Hamilton, like Stewart, acknowledged that the mind can form an abstract notion which can not be described as general. It does seem strange, after this, to find him allotting no place to the Abstract Notion in his Logic. In his analysis he has, like all the logicians of the school of Kant, no other notion than the Concept or the General Notion. In consequence of this omission he has not been able to give an accurate account of certain peculiarities of thought which he has had the shrewdness to notice. I hope to show that we have only to give its proper place to the Abstract Notion to find that we are able to render a clear and scientific account of certain processes of thought which the old Logic had overlooked, but which the Kantian Logic had observed; and that we can thereby remove the hiatus between the Kantian and Aristotelian Logic; and rear out of the two a simple and consistent structure.

(3.) *The General Notion.* This is the concept of the Kantian and Hamiltonian logic. In order to distinguish the

other two, the Singular Concrete and the Abstract, from it, I am inclined to call them PERCEPTS and ABSTRACTS, and retain the word CONCEPT for the generalized notion. The first part of Logic will thus treat of Percepts, Abstracts, and Concepts. In the formation of the Concept the two first steps are, a perception more or less vague of concrete objects resembling each other; and the fixing more or less determinately on the points of resemblance. We then, as a third and the consummating step, form the class notion, which is such that it embraces all the objects possessing the common qualities, not merely the objects we happen to have noticed, but all others, real or imaginary. There are thus two elements involved in the Concept; there are objects combined, and there are qualities combining them. As embracing objects, the Concept is said to have Extension; as implying qualities, it is said to have Comprehension. The Extension becomes greater as the number of objects embraced in it increases; and the Comprehension becomes greater as the number of combining qualities increases.

But, according to this account, the distinction between the Extension and Comprehension of a Notion has no applicability to the Abstract Notion. Such Concepts as mineral, vegetable, animal, may have Extension, as they embrace objects; but such Abstracts as hardness, vitality, sensibility and rationality can not be said to embrace objects; they are merely qualities of objects. This reveals to us one of the fundamental errors of Hamilton, who, admitting no other notions than Concepts, makes all notions have both Extension and Comprehension. This has led, as we shall see, to an inconvenience; for, by exhibiting all arguments in the form both of Extension and Comprehension, he has multiplied the Modes of the syllogism to an extent which is felt to be a burden to the memory and the apprehension.

All Notions belong to one or other of those classes; they are Percepts, as, *that grave*; or they are Abstracts, as

peacefulness; or they are Concepts, as *peaceful*. These may be mixed with each in an indefinite number of ways, the product, the Mixed Modes of Locke, always belonging to some one of the three kinds of Notions. Thus Collective Notions are truly singulars; but composed of a number of singulars, each of which is in a class or under a universal notion; e. g., "regiment" is a singular notion, not applicable to each of the soldiers comprised it, but embracing a definite number of persons, each of whom falls under the head (indefinite) soldier. But let it be observed that this term may be made a general one, referring to all and to each of an indefinite number of objects, as when we speak of "cavalry regiments" and "infantry regiments." It should also be noticed that the same term is often made to stand both for an Abstract and a Concept. Thus, "substance" is primarily an Abstract term, standing for that which abideth in objects material or mental. But it stands for a Concept when we speak of there being two substances, mind and body. Thus, "virtue" is an abstract term standing for the common quality of morally good actions; but it is also used as a common noun, as when we talk of the cardinal virtues. These distinctions will be found to have a great significance in the analysis of the process of thought involved in Judgment and Reasoning.

II. LOGICAL JUDGMENT.

The Quantification of the Predicate. In the common Logic the predicate is represented as distributed in all negative propositions, but not distributed in affirmatives. Thus, when we say "no man is perfect," we exclude men from the whole class of perfect beings; but when we say "man is fallible," "fallible" is not taken for all its significates, for there be other beings fallible as well as man. But Hamilton says that the predicate should always be quantified, that is, declared either particular or universal; thus, the logician should express the proposition last given, "All men=some fallible."

He justifies this on the ground that whatever is contained implicitly in spontaneous thought should be unfolded explicitly in logical forms. I admit the principle, but I deny that it requires the quantification of the predicate in affirmative propositions. In the vast majority of affirmative propositions the predication is made in Comprehension rather than Extension. When we say that "the sea roars," we are attributing a quality to the sea, and we are not determining in thought whether there are other things that do or do not roar. When we say "man reasons," we are ascribing an attribute to him, probably without settling or even inquiring whether there are or are not other beings who reason, whether brutes do or do not reason; and so the logician is not required to put the proposition either in the form, "all men=some reasoning beings," or in the form, "all men=all reasoning beings."

Distinction between Substitutive and Attributive Judgments. This is the distinction drawn by Dr. Thomson, who represents it as the same with that of Aristotle between Convertible and Inconvertible Propositions. Thus, "man is rational," is a Substitutive or Convertible proposition, for the two terms are coextensive, and we can say, "all rational beings are men;" while "man is mortal" is Attributive and Inconvertible, and we can not say "all mortals are men."

But neither Hamilton nor Thomson has seen what is the precise nature of those propositions which are Substitutive or Convertible. It will be found that in these the terms are Singular or Abstract. In the Substitutive Proposition, "Sir Walter Scott was the Author of Waverley," we are comparing two singular notions, one a singular concrete, and the other a singular abstract. In the Convertible Judgments, " $2 \times 2 = 4$," the notions are both abstract. The same is the case with all definitions, as when we say "Logic is the Science of the Laws of Discursive Thought," the terms "Logic" and "the Science of the Laws of Discursive Thought," both designate one thing, and not, as general terms always do, an indefinite number of

things possessing common attributes. I hold it to be the same in the proposition "all men—all rational beings." It is of importance to determine what is the precise interpretation of such propositions which play so prominent a part in the "New Analytic." When we say, simply, "all men are rational," we mean that every one man, every one in the class "man," is in the class "rational." But, if we have further found that every rational being is in the class man, we are entitled to say, "all men are all rational." But what do we mean when we say so? It seems clear to me that the terms are no longer general, standing for each one of a class; we do not mean, every one man—all rational;" nor, "every one man—every rational." The word "all" does not now mean "every one," but "all collectively." The meaning, in fact, now is, "the whole class men—the whole class rational." If so, the terms are not general, applicable to every one of an indefinite number, but singular, with a process of abstraction involved. To take one other example: The mathematician demonstrates that "equiangular triangles are equilateral," meaning that every one equiangular triangle is so. He also demonstrates that "equilateral triangles are equiangular." He can now say, "the whole class of equiangular triangles is equivalent to the whole class of equilateral;" and the terms are singular abstracts, and the proposition Substitutive and Convertible.

It is quite different in those propositions in which one notion is a Concept, or both are so. Here the relation involved is one of joint Comprehension and Extension, sometimes the one and sometimes the other being uppermost in thought. When we say "roses dicotyledons," we mean that they have the attribute of growing from two cotyledons or seed lobes, and that they are in class of dicotyledons. In such a proposition the predication is Attributive with Extension implied; and the terms are not Convertible, for there may be other things with the same attribute, or in the same class, as well as those of which the predication is made. We are now in

circumstances to examine the Table of Judgments furnished by the school:

- A. All plants grow.
- E. No right action is inexpedient.
- I. Some muscles act without our volition.
- O. Some plants do not grow in the tropics.
- U. Common salt is chloride of sodium.
- Y. Some stars are all the planets.
- ω. Some trees (oaks) are not some trees (poplars).
- η. No New Englander is some Virginian.

These are the Judgments sanctioned by Hamilton. The two marked by the Greek letters are criticised by Thomson, and rejected on the ground that while they are conceivable cases of negative predication they are not actual—I would add, in spontaneous thought. Thus, η has the resemblance, not the power of denial; and it denies nothing, and decides nothing. I discard Y on the ground that it is never uttered by us in spontaneous thought, in which we say, instead, “all the planets are stars” (A). Rejecting these three forms on these special grounds, I farther decline to give them a separate place in the Table of Judgments, on the general ground already explained; that I do not believe, in all judgments, or even in most, that the predicate is quantified in spontaneous thought. I admit that they are forms which may be reached by Conversion or other kinds of Immediate Inference to be explained immediately; but then it has never been deemed necessary, or even proper, to introduce such among the forms of spontaneous judgment; and, if we are to adopt these, we must, by parity of reason, introduce others and make the table considerably more numerous. I am inclined, however, to think that it is of importance to separate those propositions which are Substitutive or Convertible in spontaneous thought from the others, and that it may be of use to have a letter, U , to designate them. But let it be observed that, in the Judgments thus denoted, the notions compared are Percepts or Abstracts. We are thus enabled to retain the old Table, A , E , I , O , for all those judgments in which we have a Concept, adding U to include the important class of propositions which

have been seen to be Convertible since the days of Aristotle, and which turn out to be those in which the Notions compared are not general or class notions.

Meaning of the Word "Some." In the common Logic, *some*, as the sign of particularity, means *some at least*—some, we do not say how many, it may be only one, or it may even be all, provided we do not declare it to be all. But, in late discussions, "some" has taken, at least, two other meanings. It may signify *some not all*, some at most, as when we say, "some lawyers are not greedy," implying that there are others who are greedy. Again, it may mean *some certain*, as the *ω* of the New Analytic, "Some trees (oak) are not some trees (maples)." It is evident that if these meanings are introduced, the Table of Judgments must be considerably swelled and swelled unnecessarily.

Relation of the Notions in a Judgment; or, in other words, what is the precise signification of the copula or *nexus* which binds the terms. The language of the school I am examining is, on this subject, vacillating and unsatisfactory in the extreme. Sometimes the relation is said to be one of Identity, and the whole of Logic is said to be regulated by the principles of Identity, Contradiction and Excluded Middle. But, again, the relation is said to be one of Equation, and the proposition is written, "all men=some mortals." At times it is spoken of as the relation of Whole and Parts—the one term is part of the other. Again, it is represented as one in which the subject is contained in the predicate in respect of Extension, and the predicate contained in the subject in respect of Comprehension, e. g., "man is mortal," means "man is contained in the class mortal," and "mortality is an attribute of man." But, once more, the relation is one of agreement or disagreement in what is not said. The question arises, which of these is the correct account, or do any or all of them express the exact truth? I believe there is a truth

in all of them, but they do not, separately or collectively, unfold all that is contained in spontaneous thought.

It is true the relation is always one of *agreement* or *disagreement*; but the phrases are too vague; the science must give a reflection of what is involved precisely in our natural thinking. The relation is not always one of identity and non-identity, or of equality and inequality; for when we say "some metals are not heavier than water," we are not declaring that "some metals" are not identical with "heavier than water," nor that "some metals" are not equal to "heavier than water." Still there are cases in which the relation is one of identity or equality, or, in one word, of equivalence, as when we say, "Wellington was the conqueror of Bonaparte at Waterloo;" " $3 \times 3=9$;" "Ethics is the science of man's motive and moral nature." But these turn out to be cases in which none of the terms is a Concept, in which, in fact, the Notions are Singular or Abstract. There are other cases in which the relation is one of Joint Comprehension and Extension, as when we say "lichens are plants," we mean that they have the properties of plants and may be included in the class plants. In all such cases there is a class notion in the Judgment, or, more frequently, both are class notions.

It thus appears that the relation between the terms, or, in other words, the meaning of the copula, may be one or other of two things; it may be one of equivalence, or it may be one of joint Comprehension and Extension. It is the former in all cases in which the terms are singular or abstract. And it may be observed that, in this class of propositions, neither term has any title more than the other to be regarded as subject or predicate—either term may be subject or predicate, as we choose to make it; and they may be converted without any change. Thus we can put the proposition in the forms they have taken in last paragraph; but we can say with equal propriety, if it suits our purpose at the time: "The conqueror of Bonaparte at Waterloo was Wellington;" or " $9=3$

x 3;" or, "the science of man's motive and moral powers is Ethics." It is different with the other class of Judgments in which there is one Concept or two Concepts; one of them is naturally the subject and the other the predicate. We may say, "sweet is the breath of morn," but the subject is "breath of morn," and the predicate is "sweet." In this class of propositions the subject is the one to which the attribute is ascribed, the one included in the class, real or potential, possessing the attributes. Such propositions are not convertible, for there may be other objects possessing the attributes.

III. REASONING.

Immediate Inferences, so called by Hamilton and Thomson, the same as Kant calls Syllogisms of the Understanding. They are inferences without a middle term. They have been beautifully expanded by Thomson, when, from the single judgment, "all men are mortal," he derives fourteen others. They constitute a real accession to the science. Not that they were altogether overlooked by the old logicians, who, under Judgment, treated of Conversion and Opposition, which are, in fact, forms of what is called Immediate Inference. I am inclined to think that they should be treated under the head of Judgment rather than Reasoning. They are, in fact, TRANSPOSED OR IMPLIED JUDGMENTS. If this were the place, I think I could show that they are all involved in the relations of the Notions compared. When the relation is one of equivalence, the new forms are all involved in the identity or equality. Thus, if there be given us, "Socrates was the noblest philosopher of Greece," and "the angle A B C = the angle D E F" we can also say, "the noblest philosopher of Greece was Socrates," and "the angle D E F = A B C," etc. But, when the relation is one of Joint Extension and Comprehension, we can draw out all that is implied both in the Extension and Comprehension. Thus, from the judgment,

“all men are mortal,” we can, by Extension and Comprehension, draw the following:

EXTENSION.

Every man is in the class mortal.
 This man is in the class mortal.
 Every tribe of men is in the class mortal.
 Some men are mortal.
 Some mortals are men.
 It is not true that no men are mortal.
 It is not true that some men are not mortal, etc.

COMPREHENSION.

Mortality is an attribute of every man.
 Mortality is an attribute of this man.
 Mortality is an attribute of every tribe of men.
 Mortality is an attribute of some men.
 Immortality may be denied of all men.
 No man is immortal.
 Immortal beings are not men.
 Men of wealth are mortal with their wealth, etc.

The Regulating Principle of Reasoning. Hamilton and his school vacillate on this point, as they do in regard to the relation of the terms in the proposition. Sometimes it is said to be principle of Identity: “Things which are the same with a third are the same with one another.” Sometimes it is the principle of Whole and Parts: “What is a part of a part is a part of the whole.” Sometimes it is a principle of Attribution: “*nota notæ est nota rei ipsius.*” At times they seem to be defending the Dictum of Aristotle, “whatever may be predicated of a class may be predicated of all the members of the class.” Very often it is put in the form: “Things which agree with one and the same thing agree with one another.” This last is undoubtedly correct, and is applicable to all mediate reasoning; but then it is too wide; we must specify the nature of the agreement necessary to make the reasoning valid. At this point the distinction between the Singular and Abstract Notion on the one hand, and the General Notion on the other, will be found serviceable to us; will be found, in fact, to settle the disputed points in Formal Logic. It has been seen by many profound logicians that the Dictum is not the accurate expression of the regulating principle applicable

to certain simple forms of reasoning. That principle is: "*Things which are equivalent to* (that is, identical, with or equal to) *one and the same thing are equivalent to one another.*" This is the principle regulating all reasoning in which the terms are Singular or Abstract, as,

David was the youngest son of Jesse;
 David was the youth who slew Goliath;
 ∴ The youngest son of Jesse was the youth who slew Goliath.

Or

∴ Logic is the Science of the Laws of Discursive Thought;
 Metaphysics is not the Science of the Laws of Discursive Thought;
 Logic is not Metaphysics.

We have seen, formerly, that in such propositions the two terms are convertible; we may make either the subject and either the predicate. I have now to add, that in reasoning with such terms there is no such thing, properly speaking, as Figure. The middle terms "David" and "the Science of the Laws of Discursive Thought," may take any place you please in the premises, and the reasoning be equally valid, and, I may add, equally correct in form. Under this head I place

THE UNFIGURED SYLLOGISM OF HAMILTON:

Copperas and sulphate of iron are identical;
 Sulphate of iron and sulphate of copper are not identical;
 Copperas and sulphate of copper are not identical.

In this form the things we compare in thought do not constitute the terms, and the copula, "identical with," is turned into the predicate. Express the reasoning properly and it is seen that the terms are singular:

U. Copperas is sulphate of iron;
 U. Sulphate of iron is not sulphate of copper;
 U. Sulphate of copper is not copperas.

Great clearness is introduced into the analysis of the reasoning process by allotting to such cases, with their principle, a separate place.

The Dictum of Aristotle. The middle term, by which the comparison of the extremes is effected, is, in both premises, put under a class, or has a class or an individual put under it; and the law regulating the whole process is: "Whatever

may be predicated of a class may be predicated of all the subclasses and individuals placed under it." Figure, or the position of the middle term in reference to the extremes, has now a place and an important place; and it is the fittest principle according to which to divide the forms of the syllogism. The various formulæ originating with Aristotle and perfected by the scholastics and the logicians of the seventeenth century, and constituting a body of rules as complete as are to be found in any science, are now at our service. Fortunately we are not required to abandon them, though we limit them to reasoning in which there is a class notion.

We have thus two regulating principles of reason. But may not the two be combined? I believe there are cases, not very numerous, but still of some importance, in which they are:

- A. Locke lived in the seventeenth century;
- U. Locke is the greatest of English metaphysicians;
- A. The greatest of English metaphysicians lived in the seventeenth century

Perfect Induction, in which we affirm of a whole class what we have found true of each of the members of the class, falls under this head:

- A. Shem, Ham and Japheth were in the ark;
- U. Shem, Ham and Japheth were the whole sons of Noah;
- A. The whole sons of Noah were in the ark.

In both these examples two of the terms are Singular, and one of the premises is convertible, because the relations of the terms is identity. To this same head I refer a case of Thomson's:

- A. Certain sciences are classifications;
- U. These sciences=Mineralogy, Botany and Zoology;
- A. Mineralogy, Botany and Zoology are classifications.

It would not be difficult to draw out a few formulæ embracing all cases of valid reasoning of this mixed character.

Reasoning in Comprehension. It now only remains to discuss the question whether reasoning is according to the Extension or Comprehension of the Notions, or according to both. Hamilton maintains that reasoning is primarily in

Comprehension. I have thought much on the subject, and have come to a different conclusion. First of all, in reasoning, proceeding on the principle of equivalence or equipollence, we can not proceed according either to Extension or Comprehension, for the terms, properly speaking, have neither. Then, in regard to reasoning with Concepts or Attributive Judgments, it is admitted by him and by me that it may be expressed in either form. The reason has been given. Every Concept has both Extension and Comprehension, and every Attributive (not every Substitutive) proposition may be interpreted in both. If you have reasoning in the form of Extension, you can translate it into Comprehension and *vice versa*. The question is, which is uppermost in spontaneous thought? With the great body of modern logicians I hold that we look first to Extension. When we argue that the "Red Indian, having the power of speech, is a human being," we refer, in thought, the Red Indian to the class of those who have the power of speech, and proceed on the principle that the class men have all the power of speech. Of course the possession of attributes is implied in each of the terms; but, in the ratiocination, we require to proceed on the principle that there are classes possessing the attributes; and it is because this is recognized that the conclusion is seen to follow. Hence it is that logicians insist that in the evolution of the process there should be a major premise as well as a minor expressed. The following is Hamilton's explication of reasoning in Comprehension, when we argue "that man, being responsible, must be a free agent:"

"The notion man comprehends in it the notion responsible agent: But the notion responsible agent comprehends in it the notion free agent: Therefore, on the principle that the part of a part is a part of the whole, the notion man also comprehends in it the notion free agent."

Let it be observed that, of the three notions involved, "man," "responsible," "free agent," two, at least, "man" and "free agent" are class notions, and even "responsible" is

potentially a class notion. The reasoning is conclusive only on the condition that the whole class "man" is in the class "responsible," which, again, is in the class "free agent." But the interpretation in Comprehension is always possible; it may often be expedient to give it; and it is of importance that students of Logic should know how to give it in every case.

I have taken up, I believe, all the modifications proposed by the School of Hamilton. I have given what I believe to be the correct version of the phenomena of the thinking mind, which have been brought prominently under notice by that able class of thinkers. The conclusions which I have reached enable us to retain the old Logic with all its scientific perfection, while adding some fresh and important laws which it had overlooked, not destructive of the system, but tending rather to bear it up.

Having been invited to contribute an article to the *American Presbyterian Quarterly*, I venture, through it, to give my views to the general public, even as I have been expounding them for years past to my class. In my *Examination of Mill's Philosophy*, I have given an exposition of the same principles in their bearings on Mill's *Logic*, and I am just sending to a *British Quarterly* my reply to the strictures which he has offered upon me in his Third Edition. I should like those interested in these questions in America to subject them to a discussion publicly or privately, and the result must be beneficial.

JAMES McCOSH.

.Queen's College, Belfast. Jan. 1868.