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A SHORT
HISTORY OF LOGIC

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A SHORT
HISTORY OF LOGIC

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PREFACE

THE article on Logic which Professor Adamson contributed to the ninth edition of the *Encyclopædia Britannica* consists of a critical survey of the history of logical theory; its value is well known to philosophical students; and no apology is needed to justify its publication in separate form. It may be mentioned, however, that this publication was thought to be important at the present time, as the work was in danger of becoming less easily accessible owing to the issue of the eleventh edition of the *Encyclopædia*, in which it is not reprinted.

The manuscript of the article has been fortunately preserved — alone among the manuscripts of the author's published writings. It is much fuller than the printed article, a number of passages—some fifty in all—having been struck out by the editor with a view to economy of space. These passages affect both text and notes; they vary in length from a few words to whole sections; they vary also in importance; but the author's own opinion was that the value of his

work had suffered by their omission; and with this opinion I agree. In the present book these passages have been restored to their place, so that the article as it left the author's hands is now, for the first time, placed before the reader.

The manuscript bears no trace of the editorial blue pencil, and the original proof no longer exists: so that a doubt may arise as to whether any particular omission may not have been made by the author himself when he corrected the proofs. But it is clear, from a comparison of manuscript and print, that his proof-corrections were few and unimportant. No real difficulty, therefore, has arisen in deciding upon the restorations. The author's style was so concise that greater brevity could not be attained without sacrifice of the matter.

It should be borne in mind that the article on Logic was written and published in 1882. The supplementary articles, by which it is followed in this volume, are all contributions to the history of logic; but the first of these—that on Category, also reprinted from the *Encyclopædia Britannica*—dates from six years earlier; and only the last carries the story on towards a more recent development of logical theory. Readers of the author's works do not need to be reminded that his own point of view underwent modification, and that there are some things here which he might have expressed differently had he revised the work himself.

With the author's manuscript and printed copy before me, my own work as editor has consisted chiefly in selecting the material and seeing it through the press. Some omitted references have been supplied; a few slips of the pen or the press, formerly overlooked, have been corrected; unwieldy paragraphs have been broken up, and the punctuation has been simplified; but nothing new has been added to text or notes. I am responsible for the choice of a title.

It remains for me to express my grateful thanks to the Syndics of the Cambridge University Press for allowing the publication of the articles on Logic and on Category in the present form. For permission to reprint the critical notices from *Mind*, with which the volume ends, I am indebted to the kindness of Professor Davidson of Aberdeen, literary executor of the late Professor Bain.

W. R. SORLEY.

King's College,
Cambridge, *October* 1911.

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SHORT HISTORY OF LOGIC

I

PROVINCE AND METHOD OF LOGIC

1. Logic, in the most general acceptation of the term, may be regarded as the systematic study of thought. So wide a definition is certainly sufficient to comprehend all that may have been at various times included within the scope of logical doctrine, but in other respects it is of small value. For it seems essential that to any separate and independent theory there should be assigned a distinct province and a distinct method. But neither province nor method, as in any way special or peculiar to logic, is marked off by the above description. The terms *thought* and *systematic study*, indicating the object and method of logical treatment, might, even in similar combination, be appropriately used in defining, totally or partially, philosophic disciplines not generally viewed as synonymous with logic. They do not serve, therefore, to mark off logic from philosophy as a whole, which is unquestionably the systematic exposition of thought, nor from psychology, which includes

within its wider range what may well be described as the study of thought. That some more accurate discrimination of the province and method of logic is absolutely necessary will readily be granted; for, in default thereof, neither the extent of matter to be included within the study nor the peculiarity of the method by which such matter is treated can be determined. The boundaries of logic and its essential constitution must otherwise remain fluctuating and vague.

Preliminary queries of a similar kind are naturally encountered in the case of all other branches of human knowledge; and though it is to be acknowledged that many of the sharp distinctions by which one is differentiated from the other are provisional merely, and demand restatement when a somewhat higher point of view is reached, yet their necessity and utility must be allowed. The sciences are not advanced but retarded when their provinces are allowed to overlap and become indeterminate. There are two methods by which these preliminary questions are generally answered — two methods which in themselves express directions of human thinking and which have at all times occupied a remarkable place in the system of logic. We may refer either to the distinct characteristics of the matter to be treated, or to the essential features of the method of treatment. We may determine the province of a science either by external division, by classification of objects according to their prevailing resemblances and differences, or by internal definition, by exposition of the fundamental characters of the method employed in the science. By neither process, unfortunately, can an unambiguous answer be supplied, at least without much art, in the case of logic. Neither by classification of the sciences, and assignment of some specific place in the general hierarchy to

logic, nor by precise determination of the character of logical analogies as opposed to all other forms of study, can there be readily attained a definition, at once full and exact, of the system of logic.

2. The reasons for the manifold difficulties encountered in the attempt to determine accurately the province of logic, whether by reference to a division of the sciences or by precise definition of the essential features of logical analysis, are not far to seek. The systematic classification of the sciences is not the result of mere observation and comparison; the selection of the points of agreement and difference involves not only consideration of the contents of the sciences as empirically presented, but also certain leading principles or fundamental views, which are in essence of a philosophical character. According to the general conception of knowledge which in various kinds is manifested in the special sciences, there will be radically divergent methods of classification, and the province assigned to each member of the ensemble will, for the most part, have its limits determined according to the character of the general view adopted. Moreover, if any of the more prominent specimens of classification of the sciences be critically inspected, they will be found to presuppose a certain body of principles which are wider in scope than any of the special disciplines, and to which no place in the ensemble can be assigned. In short, a systematic distribution of human knowledge into its distinctly marked varieties rests upon and presupposes a general philosophy, the character of which affects the place and function of each part of the distribution.

Logic, as may readily be imagined, has therefore experienced a variety of treatment at the hands of systematisers

of scientific knowledge. It has appeared as one of the abstract sciences, in opposition to those disciplines in which the character of the concrete material is the essential fact; as a subordinate branch of a particular concrete science, the investigation of mental phenomena; as a nondescript receptacle for the formulation in generalised fashion of the method and logical precepts exemplified in the special sciences. By such processes no more has been effected than to bring into light, more or less clearly, some of the characteristics of the supposed science, without in any way supplying an exhaustive and comprehensive survey of its boundaries and relations to other branches of knowledge.

Thus, when logic is marked off from the concrete sciences and associated with mathematics in the most general sense, as the treatment of formal relations,[1] and further differentiated from mathematics as implying no reference to the quantitative character of the most general relations under which facts of experience present themselves,[2] there is certainly brought to the front what one would willingly allow to be a commonplace respecting all logical analysis, namely, that its principles are coextensive with human knowledge, and that all objects as matters of conscious experience have an aspect in which they are susceptible of

[1] As, *e.g.*, by H. Spencer, *Classification of the Sciences*, pp. 6, 12; H. Grassmann, *Die Ausdehnungslehre von* 1844 (1878), Einleitung, xxii.–xxiii.

[2] Logic and mathematics, under this view, may be regarded either as generically distinct—which is apparently the opinion of Spencer, H. Grassman, and Jevons—or as species of a more comprehensive genus, the theory of formal (symbolic) operations—which is apparently the opinion of R. Grassman (see his *Formenlehre*, 1872) and Boole (see his *Mathematical Analysis of Logic*, 1847, p. 4, and *Differential Equations*, 1859, chap. xvi., specially pp. 388, 389). An admirable treatment of that which is implied in Boole's method is given in Mr Venn's *Symbolic Logic*, 1881.

logical treatment. But no more is effected. It is still left to a wider consideration to determine what the specific aspect of things may be which shall be called the *formal* and be recognized as the peculiarly logical element in them. There may be selected for this purpose either the general relations of coincidence and succession in space and time, or the fundamental properties of identity and difference, or the existence of classes; but in any case such selection depends upon and refers to a theory of the nature of knowledge and of the constitution of things as known. In truth, the notions of *form* and *formal relations* are by no means so simple and free from ambiguity that by their aid one can at once solve a complicated problem of philosophic arrangement. To lay stress upon *form* as the special object of logical treatment still leaves undecided the nature and ground of the principles which are to be employed in evolving a science of form, and therefore leaves the logical problem untouched.

Still less satisfactory are the results when logic is regarded as in some way a subordinate branch of the psychological analysis of mental phenomena.[1] Neither the grounds on which such a classification rests, nor the conclusions deduced from it, seem beyond criticism. The simple facts that certain mental processes are analysed in logic, and that psychology is generally the treatment of all mental processes, by no means necessitate the view that logic is therefore the outgrowth from and a subordinate part of psychology. For it is clear, on the one hand, that logic has a scope wider than psychology, since in any sense of the term it has to deal with all the processes (or with some aspect of all the processes)

[1] For this extremely common arrangement, see Hamilton, *Lectures on Metaphysics*, i. p. 121-3; Ueberweg, *System der Logik*, § 6.

by which on any subject knowledge is formed out of disjointed or disconnected experiences. And, on the other hand, since the subordination of one science to another, as species to genus, is fallacious, unless the two agree in fundamental characteristics, the position so assigned to logic would imply that in aim and method it shall be essentially one with psychology, a position equivalent to the negation of logic as a separate and independent discipline.

It is not surprising therefore to find that, so soon as logic has been distinguished as arising from psychology, and so dependent on it, the peculiarity of its position and functions compels the recognition of its more general scope and the reduction of its connection with psychology to an amount small enough to be compatible with absolute independence. Strong reasons, indeed, may be advanced for holding that logic is entirely to be separated from psychology, as differing from it in aim, method, and principle, that logical analysis is generically distinct from psychological, and that the two disciplines, while connected as parts of the general body of philosophical reflection, hold to one another a relation the reverse of that commonly accepted.[1]

As to the endeavour to collect from consideration of the sciences in detail a body of precepts, the rules of scientific method, and to assign the systematic arrangement of such rules to one special discipline, called logic, it seems to stand on the same footing and to be open to the same criticism as the allied attempt to treat general philosophy

[1] It is to be acknowledged that most of the writers on logic who emphasise the connection of psychology with logic introduce distinctions equivalent to the remarks above made, but the grounds for such distinctions and the conclusions to be deduced from them are not generally brought into clear light.

as the receptacle for the most abstract propositions reached in scientific knowledge. There is a peculiar assumption underlying the supposed possibility of distinguishing between scientific method and its concrete exemplifications in the special sciences, and only on the ground of this assumption could there be rested the independence of logic as the systematic treatment of method. It is taken for granted, without examination, that the characteristic features of correct and well-founded thinking are palpable and general, and that we thus possess a criterion for marking off what is common to all scientific procedure from that which is special and peculiar to the individual sciences. An elaborate philosophic doctrine lies at the root of this assumption, and the position assigned to logic may easily be seen to depend, not on what is apparent in the argument, namely, comparison of the sciences with one another, but on what lies implicit in the background, the philosophic conception of the nature of scientific knowledge in general. Without reference to the ultimate philosophic view, no definite content could be assigned to logic, and it would remain impossible to distinguish logic from the sciences in detail.[1]

3. Thus the various attempts to define the province and functions of logic from general classification of the sciences, to define, in short, by the method of division, yield no satisfactory answer, and refer ultimately to the philosophic view on which classification and division must be based. A similar result becomes apparent when we consider the

[1] See, for a clear statement of this impossibility, Comte, *Philos. Positive*, i. 34, 35. Definitions of logic as theory of method, which are based on general philosophic views (*e.g.*, the definition by Sigwart, *Logik*, i. § 1), stand on a different footing, and are to be examined on different principles.

various descriptions of logic that have been presented as following from more precise and accurate determination of the essential features of logical analysis and method.

"The philosophical deduction or construction of the notion of logic presupposes a comprehensive and well-grounded view, whether of the nature and mode of operation of the human mind, a definite part of which falls under logical treatment, or of the problems and objects of philosophy in general, from among which in due order may be distinguished the particular problem of logic." [1] The most elementary distinctions, by means of which, in the ordinary exposition of logic, progress is effected towards an accurate determination of the province of the science, not only refer to some such ultimate philosophic view, but lead to the most diverse results, according to the peculiarity of the views on which they are based. Of these elementary distinctions the following are at once the more usual and the more important:—the distinction between the province of logic and the province of the special sciences, as that between general and special; the distinction between natural growth of knowledge, with its natural laws, and the normal procedure whereby grounded knowledge is obtained, with its normal or regulative principles; the distinction between knowledge as a whole and its several parts, immediate and mediate, with restriction of logic to the treatment of all or portion of mediate knowledge; the distinction between the constituents of knowledge as on the one hand given from without (in experience), and on the other hand due to the elaborative action of intellect itself. To one or other of these may be traced the common definitions of logic, and a brief consideration of their contents will be sufficient to show that they severally rest upon more or less

[1] Twesten, *Die Logik, insbesondere die Analytik* (1825), p. 2.

developed general philosophic doctrines, and that their significance for accurate determination of the field of logic depends not so much on what is explicitly stated in them as on what is implied in the general doctrines from which they have taken their rise.

The distinction of logic from the sciences, as dealing in the abstract with that which is concretely exemplified in each of them, is certainly a first step in the process of determination about which there can be little or no doubt. But it is only a step, and progress is not much advanced thereby. For, if the distinction remain vague, it is not sufficient to differentiate logic from many other disciplines, philosophical or philological, and if it be made more precise, the new characteristics will be found to involve some special view as to what constitutes the common feature in the sciences, and to vary with the possible varieties of view. As a rule, too, the added characteristics do not serve by themselves to mark off logical treatment as an independent kind of investigation. They are most frequently obtained by a general survey of scientific procedure. Thus it may be said that in all sciences there are implied clearly defined notions, general statements or judgments, and methodical proofs; logic, therefore, as the theory of the general element in science, will appear as the treatment of notions, judgments, and proofs generally, or in the abstract. If so, then, unless some implied principle further determine the course of procedure, logic would be regarded as a merely descriptive account of the parts making up scientific knowledge, and it would be not only impossible to assign to it an independent position, but hard to discriminate it from psychology, which likewise deals with the parts of knowledge.

If it be understood, however, or explicitely stated, that in

all scientific knowledge there is community of method, resting on common principles or laws of knowledge as such, then clearly not only the province of logic, as now made identical with the treatment of the essence of knowledge, but the special nature of the theorems making up the body of logic, must depend upon the general conception of knowledge with which the thinker starts. In the view of logic taken, *e.g.*, by Mill, the fundamental idea is that of *evidence*, under which must be included all the grounds for any judgment not resting on immediate perception. So far as verbal statement is concerned, the adoption of this as the root idea would not distinguish in any special way the treatment of logical problems resting on it; but in fact each problem is dealt with in accordance with the particular theory of what, from the nature of human knowledge, constitutes evidence. Logic thus involves, or in truth becomes, a theory of knowledge, and in the end, for general spirit and details of doctrine, refers to an ultimate philosophic view. There seems no escape from this conclusion. Start as we may, with popular, current distinctions, no sooner do logical problems present themselves than it becomes apparent that, for adequate treatment of them, reference to the principles of ultimate philosophy is requisite, and logic, as the systematic handling of such problems, ceases to be an independent discipline, and becomes a subordinate special branch of general philosophy.

The attempt to avoid this conclusion must of necessity take form in some discrimination of logic from other varieties which may with it be classed under philosophy in general, and such discrimination is usually effected by laying stress on one or other of the following characteristics.

(1) In the whole process of knowledge, it may be said,

we are able to distinguish and to regard in isolation the methods according to which, from a combination of various elements, cognition of things grows up, and the laws according to which these elements must be ordered, if our subjective consciousness is to represent accurately and faithfully the relations of things. The laws of knowledge—there being understood by knowledge the whole sum of mental determinations in and through which the world of external and internal experience is realised for us—are of two distinct kinds, natural and normal. For the treatment of the natural laws the most appropriate title is psychology; for that of the normal or regulative laws the title logic is peculiarly appropriate. By the one science knowledge is regarded in its relation to the subjective consciousness, as so much of what enters into and constitutes the world of inner experience; by the other knowledge is regarded in its relation to truth, to the objective system, as the means whereby, for theoretical or practical purposes, an orderly and verifiable conception of this system is realised.

A definite place seems thus secured for logic; but, if one may judge merely from the various attempts to expound the body of logical doctrines from this point of view, the characteristic feature is not yet sufficient to determine the boundaries of the science or the specific nature of its problems. In fact, the feature selected might be accepted as the distinguishing mark of logical science by writers who would include under that common title the most diverse matters, and who would differ fundamentally in respect to the treatment of isolated problems. The metaphysical logic of Hegel, the empirical logic of Mill, the formal logic of Kant, might all claim to be developments of this one view of the essence of logic. So wide a divergence is clear evidence that the criterion selected,

though possibly accurate, is not sufficiently specific, and that the interpretation of it, which in truth determines for each the nature and boundaries of the science, depends upon the view taken respecting knowledge as a whole in its relation to the objective order of experience, respecting the import of the so-called normal laws, and respecting the subjective elements supposed to constitute knowledge.

On all sides this particular definition of logic is beset with difficulties, which it cannot afford to dismiss by means of the simple demand that knowledge shall be accepted as somehow given. For, apart altogether from the danger that under so wide a term as knowledge many differences may be accommodated, it then becomes impossible to do more than treat in a quasi-empirical fashion mental facts, the nature and peculiarities of which are to be learned from some external source. In the later, more detailed examination of the view of logic here briefly described, it will be pointed out that the usual formula by which the several logical notions are introduced, viz., that their nature as mental facts is dealt with in psychology, from which logic borrows, is in fact much more than a formula. The logical peculiarities will be found to rest mainly upon the psychological characteristics as borrowed, while it is evident that no substantive, independent existence can be vindicated for a doctrine, the succession of whose parts and their essential nature are given externally.[1]

[1] The following from Drobisch's excellent work (*Neue Darstellung der Logik*, 3rd ed., 1863) will make clear the view commented upon. "Human knowledge is partly immediate, partly mediate. The former rests on given facts, whether of sense-perception or of consciousness, the latter on that which may be deduced by thought from these facts. . . . Thought may be the object of scientific treatment from a double point of view: first, in so far as it is an activity of mind, its conditions and laws may be investigated; second, in so far as it

(2) Some of the perplexities that arise when logic is treated as the theory of the normal laws of knowledge may be obviated by the current distinction between immediate and mediate knowledge. The normal laws of knowledge might be said to apply solely to the process of mediate cognition, and their final aim would be defined as harmony between mediate knowledge and immediate experience. In fact, however, little is gained by the employment of this new characteristic. It is difficult to distinguish with perfect accuracy between the two kinds of knowledge in question; it is impossible that the treatment of the logical problem should not depend entirely on the view taken as to the nature of that which differentiates mediate from

is the instrument for acquiring mediate knowledge, an instrument that may be used not only correctly but also incorrectly, and so may lead to true or to false results. There are therefore natural laws of thought and also normal laws, prescripts, rules, according to which it must be directed in order to lead to truth. The investigation of the natural laws of thought is a problem of psychology; the determination of its normal laws is the problem of logic. . . . The logical normal laws of thought are not to be discovered by mere observation, for it would then be impossible to decide whether the mode in which we ordinarily think is also valid; but they must themselves be proved by thought, and so be shown to be necessary, not capable of being other than they are. The warrant for both the thought that proves these laws and the laws proved by it, is to be found in the thorough harmony between the two. Logic thus presents itself as in no way a mere description and analysis of thought, a descriptive science, but as a demonstrative science" (§§ 1, 2, 3). So far, there is little to object to; but clearly the whole character of the science depends (1) on the significance to be attached to the fundamental term *thought*, and (2) on the limitations imposed on the conception of laws. It becomes necessary, then, for Drobisch, as for any logician, to define his point of view regarding thought; and the definition (§§ 4, 5) at once introduces the further discrimination of form and matter, a discrimination which determines the whole treatment of the forms of logical problems.

immediate knowledge. Whether we express this as thought or as belief, its nature then becomes the all-important factor in determining the course of logical treatment, and further progress will manifest divergencies according as stress is laid on the subjective characteristics of thought, the laws to which, from its essential nature, all its products must conform, or on the limitations imposed by principles which have reference to the most general relations of the things thought about. In the one case a formal logic, of the type commonly known as the Kantian, would be developed; in the other either an empirical logic, like that of Mill, wherein the nature of notions, propositions, and reasonings is considered from the point of view of the empirical conception of experience, or a transcendental logic, like that involved in the *Critique of Pure Reason*, or a metaphysical logic, like that of Hegel, or a mixed doctrine, like that of Trendelenburg, Lotze, and Ueberweg. In short, the general philosophic view of thought is that upon which the character of logic as a science rests.

(3) There has above appeared, incidentally, one of the most current methods of solving the logical problem, by procedure from the distinction between that which is given to the mind in knowledge, and that which is supplied by the mind itself. No distinction seems more simple; none is in reality more complex. The opposition on which, in its popular acceptation, it rests is that between the individual concrete thinking subject and the world of objective facts, existing, as it were, to be cognised. The full significance of such an opposition, the forms in which it presents itself in conscious experience, the qualifications which must be introduced into the statement of it that it may have even a semblance of reality,—these are problems not solved by

a simple reference to the distinction as existing. It may well be held that knowledge is, for the individual, the mode (or one of the modes) in which his relation to the universe of fact is subjectively seized, but it is not therefore rendered possible to effect an accurate and mechanical separation of knowledge into its matter and form. Even on lower grounds it may be held that by the employment of this criterion little or no light is thrown upon the logical question. For no determination is supplied by it of the universal characteristic of form as opposed to matter in knowledge, and a comparison of various expositions will show the most startling diversity of view respecting the nature and boundaries of the formal element in knowledge.

It is of course true that in one sense any scientific treatment of knowledge is formal. Our analysis extends only to the general or abstract aspect of cognition, not to its actual details. But we are not, on that account, dealing with the form of knowledge. So soon as it is attempted to define more accurately what shall be understood by form, then it is found that various views of logic arise, corresponding to the variety of principles supposed to be applied in the treatment of form. Thus the stricter followers of the Kantian logical idea, *e.g.*, Mansel and Spalding, recognise, as sole principles which can be said to be involved universally in the action of thought, the laws of identity, non-contradiction, and excluded middle,[1] and in their hands logic becomes merely the systematic statement of these laws, and the exposition of the conditions which they impose upon notions, judgments, and reasonings. Analytical

[1] "Logic," says Spalding (*Ency. Brit.*, 8th edition), "is the regulative theory of explicative thought"; "Logic," says Mansel (*Prolegomena Logica*, 2nd ed., p. 264), "is the science of the laws and products of pure or formal thinking."

consistency, *i.e.*, absence of contradiction, is on this view the one aspect of knowledge which is susceptible of logical treatment. On the other hand, the idea of a contribution furnished by the mind itself to knowledge may lead to a more concrete and yet not less exact system of the forms of knowledge, if there be taken into account the real character of the operation by which such contribution is made. Thus in the logic of Ulrici, from the view of thought as essentially the distinguishing faculty, by which definiteness is given to the elements entering into knowledge, there follows not simply an iteration of the principle that thought must not contradict itself, but a systematic evolution of the fundamental relations involved in the action of thought, in which the more specifically logical products, the notion, judgment, and reasoning, have a determinate place assigned to them.

Not only, then, may quite distinct provinces be assigned to logic by thinkers who start with the same idea of thought as contributing to knowledge, but, as may well be imagined, the treatment of special logical problems presents a most bewildering variety. The nature of judgment, the principle of reasoning, the characteristics of thought which is in accordance with logical rule, will be viewed differently according to the special interpretation put upon the functions of the subjective factor in knowledge. Here again we find that the really influential fact in the determination of the province and method of logical science is a general philosophic conception of knowledge or thought.[1]

[1] In Rosenkranz, *Die Modificationen der Logik abgeleitet aus dem Begriff des Denkens* (1846), a similar conclusion is illustrated by an elaborate classification of possible modifications of the view of logic. Compare also Braniss, *Die Logik in ihrem Verhältniss zur Philosophie geschichtlich betrachtet* (1823).

4. Although, then, it does not seem practicable to obtain, either by external division or by internal analysis, a clear and sufficient definition of the province and function of logic, there remains yet one method by means of which the desired end may be attained. It may be that the separation of logic from other philosophic disciplines has come about historically, and that the assignment to logic of a special body of problems and a special kind of treatment is due to the accidents of its development. We might therefore hope to gain from a comparative survey of the field of logic, as that has been historically marked out, some definite view not only respecting the specific problems of logical theory, but also regarding the grounds for the isolated treatment of them. That in the history of logic there should be found a certain continuity of doctrine and development may, however, be compatible with entire absence of a common body of received logical matter, and the result of an historical research may be little more than a statement of distinct conceptions regarding the nature and province of the science, leading to the inclusion of very distinct materials within its scope. It requires but a superficial investigation of that which at various intervals has presented itself as logical theory to arrive at the conclusion that the differences in general spirit and in the mass of details far outbalance any agreement as to a few detached doctrines and technical symbols.

If the survey were limited even to the period preceding the attempts at radical reformation of philosophy in general, and of logic as included therein, to the period in which the Aristotelian doctrines, as they may be called, formed the common basis of logical treatment, we should be able to detect differences of such a kind as to indicate radically distinct fundamental views. The scholastic logic, which,

even by itself, cannot be regarded as one theory with unimportant modifications, is most falsely described as Aristotelian. The technical terminology, the general idea and plan, and some of the formal details are certainly due to the Aristotelian analysis of reasoned knowledge; but in spirit, in ruling principles, and in the mass of details the method of the scholastic logic is alien to that of Aristotle. It will be shown later that the Aristotelian analysis is saturated with the notions and aims of the Aristotelian metaphysics and general theory of knowledge, and that on that account alone, apart from the introduction of many foreign ingredients, from Stoic, Arab, and Byzantine sources, into the scholastic system, an important difference must subsist between the original doctrine and that which presents itself as but its historical development.

Even more radical is the divergence of modern logic from the Aristotelian ideal and method. The thinker who claimed for logic a special pre-eminence among sciences because "since Aristotle it has not had to retrace a single step, . . . and to the present day has not been able to make one step in advance,"[1] has, himself in his general modification of all philosophy, placed logic on so new a basis that the only point of connection retained by it in his system with the Aristotelian may be not unfairly described as the community of subject. Both deal in some way with the principles and methods of human thinking, but as their general views of the constitution of thought are diverse, little agreement is to be found in the special treatment of its logical aspect. So when a later writer prefaces his examination of logical principles with the declaration that "logic is common ground on which the partisans of Hartley and of Reid, of Locke and of Kant, may meet and join

[1] Kant, *Kritik* (ed. Hartenstein), Vorrede, p. 13.

hands,"[1] we are not unprepared for the result that, with a few unimportant exceptions, his views of logical principle coincide with those of no recognised predecessor in the same field, diverge widely from either the currently received or the genuine Aristotelian doctrines, and lead to a totally new distribution, in mass and detail, of the body of logical theorems and discussions.

Such divergence is, indeed, most intelligible. If one reflects on the significance which would be attached in any one of these logical systems, of Aristotle, of Kant, of Mill, to the *universal* or universalising element of thought, and on the fact that such universal must manifest itself as the characteristic feature in all the important products of thinking, the notion, the judgment, the syllogism, the conclusion is inevitable that difference of view in respect to the essence must make itself felt in difference of treatment of details. The ultimate aim of proof, and the general nature of the methods of proof, must appear differently according as the accepted ground is the Aristotelian conception of nature and thought, the Kantian theory of cognition, or subjective empiricism.

If, adopting a simpler method, one were to inspect a fair proportion of the more extensive recent works on logic, the conclusion drawn would be probably the same,—that, while the matters treated show a slight similarity, no more than would naturally result from the fact that thought is the subject analysed, the diversity in mode of treatment is so great that it would be impossible to select by comparison and criticism a certain body of theorems and methods, and assign to them the title of logic. That such works as those of Trendelenburg, Ueberweg, Ulrici, Lotze, Sigwart, Wundt, Bergmann, Schuppe, De Morgan, Boole, Jevons

[1] Mill, *System of Logic*, i. p. 13.

(and these are but a selection from the most recent), treat of notions, judgments, and methods of reasoning, gives to them indeed a certain common character; but what other feature do they possess in common? In tone, in method, in aim, in fundamental principles, in extent of field, they diverge so widely as to appear, not so many different expositions of the same science, but so many different sciences. In short, looking to the chaotic state of logical text-books at the present time, one would be inclined to say that there does not exist anywhere a recognised, currently received body of speculations to which the title logic can be unambiguously assigned, and that we must therefore resign the hope of attaining by any empirical consideration of the received doctrine a precise determination of the nature and limits of logical theory.

5. In order to make clear the reasons for this astonishing diversity of opinion regarding the province and method of logic, and so make some advance towards a solution of what may well be called the logical problem, it seems necessary to consider some of the leading conceptions of logic, with such reference to details as will suffice to show how difference of fundamental view determines the treatment of special logical problems. In this consideration the order must be historical rather than systematic. Not, indeed, that it is needful, nor is it proposed, to present an historical account of philosophy at large, or even of logic in particular; our purpose is merely to disentangle and bring clearly forward the nature of the principles respecting logical theory which have served as basis for the most characteristic logical systems. Such an inquiry will not only assist in explaining the divergencies of logical systems, but throw light upon the essence of logic itself. Thus, for example,

a critical comparison of the Aristotelian and Kantian or Hegelian conceptions of the end, aim, and function of logic may be expected to bring forward in their most abstract form opposed, or at least varied, views of the nature of the subject, and to enable a well-balanced judgment to be obtained on the problem involved.[1]

In this historico-critical survey, the first section must naturally be devoted to a consideration of the Aristotelian logic. If it were intended to present a complete history, or abstract of a complete history of logic, it would doubtless be necessary to preface the treatment of that from which logic, as we know it, has taken its rise, by a notice of such speculations of a logical character as are to be discovered among Oriental systems. But, however interesting such an historic research might be, its results would have little or no bearing upon the special problems before us. Our notions regarding logic are affected by the Aristotelian analysis of the method of reasoning, and by such systems as have been developed therefrom, but have been modified, and are likely to be modified, in no way by any Oriental systems of a like kind. The records of Oriental attempts at analysis of the procedure of thought are of purely historic value, and may, for our present purpose, be disregarded.[2]

[1] For a notice of works on the history of logic, see note A, p. 164.

[2] For a notice of some of the more developed systems of Oriental logic, see note B, p. 165.

II

THE ARISTOTELIAN LOGIC

6. In a remarkable passage at the close of the tract called by us the *Sophistical Refutations*, Aristotle claims for himself distinct originality in the conception of subjecting to analysis the forms or types of argument. Something had been achieved in closely allied matters, in the analysis of rhetorical methods and grammatical forms; but, in the attempt to generalise and reduce to order and method the very substance of reasoning, nothing, according to this statement, had been effected, nor had the possibility of such reduction been seriously contemplated. "The system I have expounded had not been partially, though imperfectly, elaborated by others; its very foundations had to be laid. . . . The teachers of rhetoric inherited many principles that had long been ascertained; dialectic had absolutely no traditional doctrines. Our researches were long, tentative, and troublesome. If, then, starting from nothing, it bears a comparison with others that have been developed by division of labour in successive generations, candid criticism will be readier to commend it for the degree of completeness to which it has attained than to find fault with it for falling short of perfection."[1]

[1] The above translation, which is somewhat free, is taken from Mr Poste's edition of the *Sophistici Elenchi*, p. 95.

Although the specific reference in this passage is to the analysis of dialectical argument contained in the *Topica*, the same claim might with justice have been made in regard to the more extensive analysis of the forms of reasoning in general which makes up the substance of the other books of the *Organon*. There had been, prior to Aristotle, much discussion of problems that would under any view be included under the head of logic; but no systematic attempt had been made to analyse knowledge as a whole in its formal aspect, to throw under general heads or classes the types of reasoning, whether dialectical or scientific, and to exhibit the general relations in which the elements of all reasoning stand to one another. After Aristotle, it became possible to refer all such discussions to a common head, and to view them as component parts of one systematic doctrine. In a peculiar sense, then, Aristotle may be described as the founder of logical science.

The precise nature of the inquiries falling within the scope of the Aristotelian logic may receive some preliminary explanation supplementary to that which can only be given by a careful study of the chief theorems of the system, if there be taken into account (*a*) the advances towards a theory of logical method contained in the speculations of earlier Greek thinkers, (*b*) the classification of philosophic disciplines, which underlies the body of Aristotle's writings, and (*c*) the general conception of the matter of logical analysis which may be deduced from any special or incidental treatment of the question in Aristotle. Of these in order.

(a) *Logical discussions prior to Aristotle.*

7. The inquiries which find a place in the Aristotelian logic are all, in a large sense, problems of the theory of know-

ledge. They arise, therefore, only in connection with critical reflection on the nature, grounds, and method of knowledge. The earliest forms of Greek speculation, turning rather upon explanation of natural fact, being in essence attempts to reduce the multiplicity of known fact to unity of principle, contain, as a consequence, problems of a metaphysical character, which might involve problems of strictly logical character, but were logical only in potentiality. The difficulties with which the early Greek speculators were presented had at first an aspect which was metaphysical only. Not until these difficulties were transferred into the sphere of thought, with the consciousness, however undeveloped, of a possible opposition between the determination of things reached by immediate processes of thinking and the characteristics of thought when submitted to critical reflection, could problems of a distinctly logical character come forward for solution. Of all these metaphysical questions the most important centre round the fundamental opposition between unity of principle and multiplicity of fact, between the one and the many, an opposition which under varied forms presents itself at every stage in the history of philosophic speculation. It is, indeed, an abstract expression for the problem with which philosophy at all times has to deal, though, naturally, the formulæ under which it makes its appearance are determined by the more or less developed conceptions of the elements entering into it that may have been attained.

In the first period of Greek speculation, the problem presented itself in its simplest, most direct aspect, and, after a few rough attempts at a quasi-physical explanation of the genesis of many out of one, there come forward, as reasoned, ultimate solutions, the Eleatic doctrine that only

unity has real being, the Heraclitic counter-doctrine that only in change, in the many, is truth to be found, and the Pythagorean notion of number, harmony, as containing *in abstracto* the union of the opposites, one and many. No one of these philosophic treatments can be said to contain specifically logical elements, but they raise questions of a logical kind, and, especially in the records of the Eleatic views, one can trace a close approximation to the critical reflection which marks the transition to a new order of ideas. Results which in these systems are stated with metaphysical reference only, reappear with new aspect among the Sophists and the Socratic schools.

The transition stage, indeed, partly aided by the atomic separation of objective fact from subjective sense experience, is mainly the effect of the Sophistic and Socratic teaching. Socrates and the Sophists have this in common that both treat the fundamental problem of philosophy as it had been handed down with special reference to the subjective experience of the individual. In their conceptions of the nature of subjective experience they differ widely from one another, just as in aim, method, and principles both differ from modern views on the same question; but in both is to be discovered the critical reflection on thought and its essence which marked a new stage of speculation and prepared the way for a fresh development of philosophical activity.[1] A brief indication of the logical

[1] It is an error to strain expressions which, with due qualifications, may be accepted as valuable. One meets repeatedly with the assertion that the characteristic difference between ancient and modern philosophy is that in the former the special problem of the theory of knowledge, the possibility of reconciling subjective thought with objective system of things, was not contemplated. In a certain sense this is true; but, taken absolutely, it is both erroneous and misleading. The Sophistic discussions, the Socratic theory of the notion, the

elements involved in this new treatment of the problem will be sufficient. In the teaching of the Sophists generally is to be discerned the opposition between subjective reflection and objective fact; in that of Protagoras and Gorgias in particular there appear as problems of the theory of knowledge difficulties for the older metaphysic of Heraclitus and the Eleatics respectively. The Heraclitean principle of change is the general foundation for the doctrine that the momentary perception is the only fact of cognition, and upon it may be based the conclusions that all truth is relative to the individual state of the individual subject, and that judgment, as a mode of expressing truth, is a contradiction in itself.[1] Thus the extreme Heracliteans, as Cratylus, rejected the proposition or combination of words, as expressing a unity and permanence not to be found in things, and reduced speech to the symbolism of pointing with the finger. Less developed but not less clear is the connection between the brief sceptical theses of Gorgias and the Eleatic doctrine of unity. As knowledge was impossible on the Heraclitean view, since it implied a synthesis not discoverable amidst incessant change, so for Gorgias knowledge was impossible, since in the synthesis was

Platonic distinctions of reason, understanding, and opinion, the Aristotelian treatment of the principles of knowledge, of the universal, and of the opposition between science and opinion, are quite unintelligible except under supposition of some such distinction. The difference is not in the problem, but in the new conceptions of the nature of the elements, and of the method of solution which modern philosophy introduces into its discussion.

[1] However we may interpret the Protagorean maxim in relation to more modern conceptions, there appears no reason to doubt the historic accuracy of the connection indicated in the *Theætetus*, and in the fourth book of the *Metaphysics*, between the Heraclitean metaphysic and the Protagorean theory of knowledge.

involved an element of difference, multiplicity, not reconcilable with the all-embracing unity of things.

It is evident from the treatment of such views in Plato and in Aristotle, how many of the illustrations used in support of the general thesis depended for their apparent strength on neglect of some of the elementary conditions of thought, and how inevitably reflection upon these difficulties led to the construction of a theory of thought. The first outlines of such a theory are to be found in the Socratic principle of the notion (or concept, as we may call it, for the notion as viewed by Socrates is certainly the concrete class notion, the simple result of generalisation and abstraction), and to Socrates is assigned by Aristotle the first statement of two important logical processes—induction, or the collection of particulars from which by critical comparison a generalised result might be drawn, and definition, or the explicit statement of the general elements disclosed by critical comparison of instances.[1] In the Socratic teaching, so far as records go, no explicit reference was made to the problems in connection with which those processes are of greatest significance, but in the lesser Socratic schools on the one hand, and in Plato on the other, we find the new principle either brought to bear upon the old difficulties, or developed into a comprehensive method.

The Socratic concept contains in itself the union of one and many, but it is in nature subjective; it is a mode of knowledge. If, then, it be regarded as only subjective, the old difficulties reappear. How is it possible to reconcile, even in thought, an opposition so fundamental as that between unity and plurality? Must there not be a like irreconcilable opposition between the subjective counter-

[1] *Metaph.*, 1078b 27-29.

parts of these objective relations, between the individual notion, the atom of knowledge, and the proposition or definition? How, indeed, can there be a combination in thought of that which is in essence uncombinable? Whether we take Aristippus, who draws mainly for theory of knowledge on the Heraclitean-Protagorean sources, or Antisthenes, who leans towards the Eleatic, or the Megarians, who also, in accordance with the Eleatic thoughts, devoted chief attention to the polemical aspect of the theory, we find a set of problems appearing, the solution of which imperatively called for a theory of knowledge as the combination of one and many.

Perhaps the most interesting of these early thinkers, so far as the history of logic is concerned, is Antisthenes, whose extreme nominalism presents the most curious analogies to some recent logical work.[1] According to Antisthenes, the world of cognisable fact consists of combinations of elementary parts (πρῶτα). These πρῶτα appear in cognition as irreducible elements denoted by the simplest elements of speech, names. The name is the mark for the sense-impression by which each πρῶτον is communicated to us, for they are only known by sense, and are strictly individual. A composite thing is known through the combination of names of its parts, and such a combination (συμπλοκή) is a proposition or definition (λόγος). Each thing has its specific λόγος (οἰκεῖος λόγος), and a judgment is merely the expression of this. There is therefore no distinction of subject and predicate possible; even identical propositions, the only

[1] On Antisthenes, see the third part of the *Theætetus*, which appears, beyond doubt, to refer to him (comp. Peipers, *Untersuchungen über das Systems Plato's*, 1874, pp. 124-48), and Aristotle, *Metaphysica*, 1024b 32, 1043b 24; *Topica*, 104b 21.

possible forms under this theory, are mere repetitions of the complex name. Predication is either impossible or reduces itself to naming in the predicate what is named in the subject. It is the simple result of so consistent a nominalism that all truth is arbitrary or relative; there is no possibility of contradiction, not even of one's self.

The theory of Antisthenes, strange as it may at first sight appear, rested on certain metaphysical difficulties, which lie at the root of all the perplexity regarding the import of propositions, and it is not too much to say that these difficulties were kept continually in mind by Plato and Aristotle in their several attempts to explain the nature of knowledge. Both thinkers bring forward, from various fields, new elements which enter into the consideration of the problem, but both find themselves confronted with the ultimate question, What is the ground of unity in things known, and in what way does thought unite the detached attributes of things into a subjective whole? What is the nature of the unity which binds things, themselves in a sense units, into classes or wholes, and how comes it that in the judgment subject and predicate are, in a sense, set at one? The inquiry branches off in varied directions, into discussions on the universal and particular, on form and matter, on the unity of the definition, but nevertheless remains the one underlying difficulty for both thinkers.

In Plato, for whom the solution was found in the participation in or imitation of ideas by things, we find more distinctly conceived the series of logical processes involved obscurely in the Socratic method. So far as positive statements regarding the ideas can carry one, it may be said that in essence these processes concern only

the formation of or deduction from the concrete universal concept or general notion. The ideas, in the Platonic system, at least in reference to the thought which apprehends them, resemble most closely class notions. A deeper significance often appears to attach to the relative processes of *induction*, whereby the resemblances of things, the idea in them, is disclosed, *definition*, whereby the content of the idea is made explicit, and *division*, whereby the external connection of ideas with one another, their system, is deduced; but such significance attaches to the more purely metaphysical aspects of the theory, and had no particular bearing on the Aristotelian treatment of the same problems. Not much is given in Plato towards a theory of the proposition, though sometimes an analysis of its elements is sketched; and the method of division could yield only a few of the types of deductive reasoning.

But, over and above these more definite contributions towards the construction of a theory of knowledge, there are general aspects of the Platonic work of not secondary importance for the Aristotelian logic. In Plato the fundamental differences of earlier philosophic views appear in a new phase, and are elevated to a higher stage. Sophistic method is analysed, not as in forms actually existing, but in its essential features, and the opposition between sophist and philosopher is viewed as the opposition between opinion and knowledge. Heraclitean principle of change and Eleatic doctrine of unity are resolved into the more comprehensive opposition of the universal and the particular, while hints of an ultimate solution, of a universal which is at once and *per se* particular, are not wanting. The Socratic method of thought appears as that by which alone a solution of philosophic difficulties is to

be obtained, and the consideration of thought in its relation to facts is marked out for special investigation. A deeper view of thought was thus made at once possible and necessary.

(b) *Classification of Philosophic Disciplines.*

8. Much, then, had been effected by Aristotle's predecessors in the way of preparing a definite body of problems and a method of dealing with them, problems and method which might fairly be said to belong to a theory of knowledge as such; and, from the occasional references in the *Organon* to opinions of contemporaries, it is evident that many isolated attempts at solution of such questions were being carried on. In Aristotle we find a systematic examination of many of these problems, but it is left by him doubtful what place in the general scheme of philosophic sciences should be assigned to it. The distribution into physics, mathematics, and first philosophy, or the wider classification of doctrines as poetic, practical, or theoretical, in no way enables us to class logic or the body of speculations making up the *Organon*. That the forms of proof analysed in these writings are of universal scope is unambiguously declared; that the first principles assumed in all proof are dealt with in first philosophy is also made clear; but the relations between the two doctrines so reciprocally related cannot be determined from any statement made by Aristotle himself. That he should have regarded the inquiries of the analytics as propædeutic in character, and should have held that those who assume to discuss problems of first philosophy ought to have made themselves acquainted with the general theory of proof, is

intelligible; and more than this significance cannot, we think, be assigned to the passage in the *Metaphysics*, on the ground of which the logical inquiries have been classed as the general, common introduction to the whole system.[1] For the close connection between the analytical researches of the *Organon* and the inquiry into essence or being as such forbids us to accept, in any strict sense, a separation of these as forming distinct and independent sciences. To metaphysics is assigned the consideration of the principles of proof, and the kind of inquiry making up first philosophy is described by Aristotle in a fashion which assimilates it most closely to the researches of the analytics. That which is left undecided by the Aristotelian classification is the relation of the logical inquiries to the organic whole of which first philosophy is the main or sole part.[2] To obtain any fresh light we must turn to the consideration of indications supplied by Aristotle as to the nature of the inquiries grouped under the head of *Analytics*.

(c) *General conception of the matter of Logical Analysis.*

9. Such indications are unfortunately most scanty. As we probably have not the *Metaphysics* in its full extent, actual or contemplated, the want of a clear separation between the inquiries belonging specially to first philosophy and those appropriate to the analytical

[1] *Metaph.*, iv. 1005b 2. See Zeller, *Ph. d. Gr.*, ii. 2 (3rd ed.), p. 184, *n.*; Rassow, *De Definit. Not.*, 46, 47; Schwegler, *Comment. zur Metaph.*, iii. 161; and, *contra*, Prantl, *Gesch. der Logik.*, i. 137. Zeller maintains the view that Aristotle intends to indicate the place occupied by the analytics in his general scheme of philosophy.

[2] On Aristotle's use of the term λογικός and its allies, see (in addition to Waitz, *Com. in Organ.*, ii. pp. 353-55) Schwegler, *Commentar zu Ar. Metaph.*, vol. iv. pp. 48-51.

researches may be due in part to the deficiency of our materials. There are, however, two lines of separation discernible, from which some useful inferences may be drawn. What we call the logic of Aristotle, *i.e.*, the treatises making up the *Organon*, is roughly divisible into three parts: (1) The formal analysis of syllogism and its allied types of reasoning, with the more particular discussion of the elementary parts of reasoning = the proposition; (2) the theory of scientific proof and definition (apodictic); (3) the theory of probable arguments, or of reasoning based on currently received opinions and leading to conclusions more or less probable (dialectic). Certainly for Aristotle there was no such distinction between the first and the remaining two parts as would in any way correspond to the modern separation of general or formal logic from the theory of knowledge, or material logic; the three parts in conjunction make up one body of doctrine. Now dialectic is very specially indicated as being of a formal character, *i.e.*, as dealing with no special matter, but with κοινά, opinions, or types of opinions common to all sciences.[1] Apodictic, we may assume, is in like manner the formal study of what constitutes knowledge strictly so called, the nature of the principles on which knowledge rests, the special marks distinguishing it, and the method by which knowledge is framed.

But in every body of doctrine we may distinguish, according to Aristotle, three things:—the genus or class of objects with which the demonstration is concerned; the essential or fundamental attributes, qualities of these objects, which are to be demonstrated of them; and, thirdly, certain common axioms or principles of demon-

[1] See *Anal. Post.*, i. 11; *Rhet.*, i. 1, and in many passages. *Cf.* Heyder, *Method. d. Arist.*, p. 348.

stration, not themselves demonstrable, and not entering as integral parts into the demonstration, but lying in the background as security for the reasoning carried out by thought employing them. Can anything corresponding to these three facts be discovered, if we assume for the moment, what certainly is not explicitly stated by Aristotle, that analytic constitutes a special body of doctrine? The genus or class about which the doctrine is concerned can only be reasoning itself, either as apodictic or as dialectic, and the latter for a special reason may be left out of account; ἀπόδειξις, then, is the matter concerning which the doctrine is put forward. But ἀπόδειξις is a form of knowledge, that is to say, is subjective. The properties, therefore, of apodictic science can only be made clear if we consider on the one hand the objective counterparts of necessity and universality in thought, and on the other hand the nature of universality and necessity of thought itself. The common principles or axioms, finally, can only be such presuppositions as are made in apodictic or reasoning generally respecting thought in its relation to fact, as grasping or apprehending reality. The consideration of such axioms, it has been already seen, pertains to first philosophy. Analytics then would appear as an independent doctrine, holding of first philosophy on the one hand, both in regard of the common axioms and in regard of the attributes of being, by which it is a possible object of science, and on the other hand referring to the subjective treatment of thought, whether in relation to principles or to fact generally.

A very similar result may be attained if we follow out a line of distinction indicated in more than one portion of the *Metaphysics*.[1] Separating the modes in which

[1] *Metaph.*, vi. 4, v. 29, ix. 10. *Cf.* Schwegler, *Com.*, iii. 241, iv. 29 *sq.*, 186; and Brentano, *Bedeutung des Seienden nach Arist.*, 21 *sq.*

being is spoken of into four—(1) *τὸ ὂν κατὰ συμβεβηκός*; (2) *τὸ ὂν ὡς ἀληθὲς καὶ τὸ μὴ ὂν ὡς τὸ ψεῦδος*; (3) *τὸ ὂν κατὰ τὰ σχήματα τῆς κατηγορίας*; (4) *τὸ ὂν δυνάμει καὶ ἐνεργείᾳ*—Aristotle excludes the second from the special researches peculiar to first philosophy, the study of being as being, but neither excludes it from general consideration in metaphysics as a whole, nor handles it at length, deferring it rather for more detailed treatment. A comparatively clear account, however, of what is understood by him under the head of being as truth and non-being as falsity may be extracted from the various passages referred to, and little doubt can remain that being so regarded is in a peculiar sense the matter of analytical (*i.e.*, logical) researches.

Being as truth and non-being as falsity refer to and rest upon combination and division of the elementary parts of thought. For truth and falsity have no significance when applied to things, but only to the connection of thought which is dominated by the one principle of non-contradiction. Nay, thinking has not even immediate and direct reference to being as such, but only to being as the existent, as qualified, or quantified, or modified in some other way (*i.e.*, according to the categories), and it is in its very essence the conjunction or unifying of elements. What cannot be conjoined, as, *e.g.*, the notions of elementary facts themselves, are not either true or false, and are not matters of thought. Thought thus moves in a definite sphere, that of the combinable or separable, the correspondence of conceptions with real relations, and has its limits on the one hand in the elementary data apprehended by intellect (*νοῦς* = reason), and on the other hand in the infinite sea of particular, accidental qualifications of things (*συμβεβηκότα*). The possibility of contradictory assertions (for true and false judgments together

make up the contradiction, τὸ δὲ σύνολον περὶ μερισμὸν ἀντιφάσεως) is the distinguishing mark of thought.

Now it is this very possibility that lies at the root of all the analytical researches. Not, indeed, that one can assume for Aristotle a view which has appeared in later logical works, that all forms of logical reasoning are to be deduced from the principle of contradiction. Quite the reverse. The common axioms underlie all processes of proof, direct or indirect, but they do not enter into or form part of proof. Nothing can be deduced from them; but their authority can be appealed to against any one who refuses to allow a conclusion reached by a correct syllogism from true premisses.[1] (The nerve of logical proof would thus lie in the disjunctive proposition; either this conclusion is to be granted, or the principle of contradiction is denied.) Now the analytical researches are in especial the treatment of combination and separation in thought. For even the syllogism may be regarded as only a complex judgment or synthesis, and in the exposition of the forms of combination and separation we shall find a complete system extending from the unproved principles and exhibiting the methods according to which thought proceeds towards the determination of the essential properties of things or the discrimination of various heads under which the transitory and accidental attributes may be advantageously classed.

So far then as one can judge, the matter of Aristotle's analytical researches may be expressed as the concrete nature of thought, characterised by its fundamental attribute, the possibility of contradiction, correlated with the real system of things, and having as its end the realisation of systematic knowledge, *i.e.*, the adequate subjective in-

[1] *Cf.* generally *Anal. Post.*, i. 14.

terpetation of being. No further explanation can be obtained without entering in some detail on the actual processes included under the title which has here been somewhat arbitrarily assigned, namely, the concrete nature of thought. At the close of this survey one may be in a position to resume with fuller knowledge the definition here given. For its significance depends entirely on the meaning which in Aristotle belongs to the terms thought and being.

10. This preliminary survey, though sufficient to enable us to fix approximately the position of the analytic researches in the total scheme of sciences, has not thrown an entirely clear light on the principle of the Aristotelian logic. For, as has just been said, the indication that the analytics have to do with being as conceived by thought, conducted under the general axiom of non-contradiction and expressed in language, requires to be filled up by a more detailed treatment of the Aristotelian theory of thought in relation to being. Upon the characteristics assigned to thought or knowledge in this special relation, must depend the general nature of the Aristotelian logic, the determination of the scope of logical treatment, and the essence of logical method. For, from a quite similar statement regarding the province within which logic moves, totally diverse conclusions might be drawn respecting the precise function of logical method. One might have either a formal doctrine or *technic*, or a real methodology: either an attempt to evolve logical principles from the axiom of contradiction, or a development of the laws according to which thought, necessarily acting under the said axiom, proceeds towards the construction of knowledge. The history of logic clearly shows how differently the matter of the analytics may be viewed.

For one of the possible conclusions, that logic is a technical or quasi-mathematical exposition of formal relations, has been accepted as the undoubted result of Aristotle's teaching, and has so prevailed as to make itself the current conception.[1] The other, the view of logic as theory of the method of scientific thought, has been cast entirely into the background, so far as logical doctrines are concerned, and, if allowed at all, has been regarded as foundation for a species of applied logic, an appendix to the other.

11. Not much aid is afforded directly by any classification or division of the books now collected together as the *Organon*. As above noted, the *Prior* and *Posterior Analytics* with the *Topics* form one connected whole, while the *Categories* and the *De Interpretatione* stand apart as isolated treatments of special problems, not organically or necessarily part of the research. The genuineness of both these treatises has been doubted, and there is, indeed, much to make one pause in admitting them to a place in the *corpus* of the Aristotelian works. The tract entitled *Categories* neither refers to, nor is referred to in, any other of Aristotle's undoubted writings; and, though the extreme opposition supposed to exist between its teaching in regard to first and second essences and the teaching of the *Metaphysics* rests on no solid foundation, the mode of expression and the general treatment have in them something strange and foreign. It is most remarkable, if the tract be Aristotle's, that no cross reference should be found between the treatment there given of fundamental notions like quantity, quality, and relation, not to speak of substance (*οὐσία*), and the book of definitions

[1] *Cf.* Brandis, *Gr.-röm. Phil.*, ii. 373-75.

contained in the *Metaphysics* (Book Δ). The concluding chapters are generally regarded as spurious, and we shall probably not be wrong in viewing the whole as a redaction of Aristotelian material rather than as a formal treatment by Aristotle himself.[1] The *De Interpretatione* has somewhat stronger external evidence in its favour, for, though it is not referred to in any work of Aristotle's, it seems to refer unambiguously to the *Analytics* and *Topics*, and vaguely to the *De Anima*.[2] Nevertheless there is this to be said, that references are not in such a case conclusive, that the structure of the book is unwieldy and clumsy, not such a treatment of the proposition as one would expect from Aristotle *after* the *Analytics*, and that in one or two points, in the classification of judgments according to quantity, and in the way of regarding modals, the teaching is not in perfect harmony with that of the *Analytics*.[3] One would not probably be far wrong in concluding here, as in the case of the *Categories*, that the work is a redaction, perhaps drawing from other lost writings of Aristotle, perhaps based on oral teaching, by some Aristotelian scholar.

In the *Analytics* the aim is defined to be the examination

[1] Internal evidence, if worth anything, is strongly against Zeller's view that the book is not only genuine, but an early work (*Ph. d. Gr.*, ii. 2, 69).

[2] See Bonitz, *Index Arist.*, *s.v.* "Aristoteles"; Zeller, *Ph. d. Gr.*, ii. 2, p. 71. The vagueness of the reference to the *De Anima*, which, indeed, cannot be verified, led Andronicus to reject the *De Interpretatione*.

[3] The differing ways in which universality in a proposition are explained in the *De Inter.* and the *Analytics* is deserving of attention, as also the absence from the *Analytics* of the peculiar designation ἀόριστον as applied to negative terms—nouns or verbs. All that is essential in the treatment of these negatives is given, however, in *Anal. Pr.*, i. 46.

of apodictic or scientific proof; but the examination of the elements of syllogism is first undertaken, since in all demonstrative science syllogism is employed, while, on the other hand, syllogism may present itself in dialectic matters. The first book of the *Prior Analytics*,[1] after a brief statement of the nature of the proposition and of the fundamental law of predication, proceeds to analyse (1) the various kinds, figures, or modes of syllogism; (2) the means by which syllogisms are formed; (3) the reduction of various imperfect forms of argument to the perfect syllogistic type. The unity of the book is unmistakable, and the plan is indicated in more than one place by Aristotle himself. The second book, on the contrary, has little or no unity, and is loosely connected with the first.[2] It consists of a series of detached tracts, dealing with the theory afterwards called that of *Consequence*, with circular reasoning, with the possibility and consequences of syllogism formed by converting parts of the original argument, with certain modes of indirect argument and fallacy, and concluding with brief handling of induction, paradigm, enthymeme, argument from signs, probabilities, &c.

The *Posterior Analytics*, much less perfect in form than the first book of the *Prior Analytics*, contains the Aristotelian theory of ἀπόδειξις or demonstrative science, and in its first book deals with the general nature of demonstration, the grounds on which it rests, its form, and its essential significance. The second book contains the theory of definition in its relation to demonstration, and falls into three portions — the first, raising difficulties or questions regarding the nature and possibility of

[1] Which is sometimes referred to explicitly as περὶ συλλογισμοῦ.

[2] The references to what has been accomplished, indeed, seem to point to some other treatment than that in the first book.

definition; the second, grounding definition, as the final result of knowledge, on the process of demonstration; and the third, in a single chapter, investigating the method by which the first principles of ἀπόδειξις are known. The book requires much supplement from the similar treatment in the *Metaphysics*, *Ethics*, and *Topics*.

The *Topics*, starting with a general explanation of syllogism and allied forms of reasoning, proceeds to investigate in what way the materials for dialectic argument are to be obtained and used. The elaborate treatment of what is now comparatively uninteresting has caused the significance of some portions of the work, as bearing on the theory of inductive research and demonstration generally, to be overlooked. Valuable hints are to be drawn from the work regarding other more important Aristotelian doctrines.[1]

12. The logical researches as a whole, then, manifest a strong unity, and at the same time refer to one fundamental opposition, that between *apodictic* and *dialectic* reasoning, the nature of which must be first investigated. It will be found that the investigation leads at once to the further problems, What precisely is Aristotle's conception of knowledge, in its origin, essential nature, and method of formation? and second, what is the foundation of the syllogism as the form of reasoning, whether apodictic or dialectic?[2]

[1] Generally one may say that a selection of these significant passages would be of greater service to the student than even so patient and detailed an abstract of the whole as is given by Grote (*Aristotle*, i. and ii.)

[2] The most important treatment of the principles and details of the Aristotelian logic, which are here drawn upon freely, are (1), *instar omnium*, that of Prantl (*Gesch. d. Logik*, i. pp. 87-346); (2) that of Brandis, *Aristoteles*, pp. 148-434, and *Aristotelisches Lehrge-*

The opposition between apodictic and dialectic is in the Aristotelian system the development of that which had already played so important a part in Plato and Socrates, the distinction between science and opinion. Knowledge in the strict sense had there presented itself as the generalised notion referring to being in its very essence, and resting on thought or reason. Opinion is the quasi-knowledge of the particular, referring to that which is not being but only accident, and resting on sense or imagination. In the Platonic method this distinction had come forward as the underlying basis for the opposition of philosophy and sophistical rhetoric; in Aristotle a much more precise formulation is given of the characteristics of the two opposed forms of thought, and the connection between opinion or dialectic and rhetorico-sophistical discussion is made more concrete and profound. Dialectic, with Aristotle, is the system resulting from the attempt to reduce to rule or generalise modes of argument which rest upon current received doctrines as principles, which move within the region of interests about which current opinions *pro* and *con* are to be found, and which terminate not in the decisive solution of a problem but in clearing the way for a more profound research, or at least in the establishment of the thesis as against an opponent.

bäude, pp. 12-62 (in which there is sharp criticism of Prantl's view); (3) that of Grote, *Aristotle*, vols. i. and ii. pp. 1-134 (most patient and accurate, but tending continuously to minimise the speculative element); (4) that of St Hilaire, in his essay *De la Logique d'Aristote*, 2 vols., 1838, and in his translation of the *Organon;* (5) that of Biese, *Phil. d. Arist.*, i. 44-319, Trendelenburg's *Elementa Logices Aristoteliæ*, Waitz's edition of the *Organon*, and Ueberweg's *System der Logik* contain much of value. Mr Poste's translation of the *Post. Anal.* and *Sophis. Elenchi*, Mr E. Wallace's *Outlines of the Phil. of Aristotle*, and Mr Magrath's *Selections from the Organon* will also be found of service.

Dialectic, then, has no special province; it deals with *κοινά* or *ἔνδοξα*, and its methods are perfectly general. On the one hand, as being the application of reasoning, it refers to and employs the specific types of reasoning, syllogism, and induction; on the other hand, as being applied to matters of opinion, and borrowing its principles from current floating dicta about matters of common interest, the types of reasoning tend in it to assume special forms resembling those employed in rhetoric (which is a kind of offshoot from dialectic—the application of dialectic to political principles).

The province of dialectic being thus essentially vague, the matters about which dialectic reasoning is concerned being of the most fluctuating character, there must be, for Aristotle, the greatest difficulty in determining, *per se* and apart from the opposition to apodictic, what is the character of dialectic syllogism and induction. Nor can it be said that the interpreter of Aristotle has an easy task in the endeavour to discover what precisely is dialectical reasoning and in what way the forms which are assumed to be common both to apodictic and dialectic come to have any application to the fluctuating mass of current opinions. It is comparatively simple to say apodictic and dialectic differ in this, that the one rests on principles essential, necessary, seen to be true, while the other proceeds from data which are merely received as credible and as containing probable received opinions on a subject about which there may be difference of view; and it may be added that in the one we reach conclusions which are essential, in which the predicate is necessarily and universally true of the subject, while in the other the conclusion remains, like the data, credible merely, and is, at best, only one of the probable answers to a

question. But there remains the difficulty, which is certainly not cleared up by any direct statement from Aristotle — of what nature is the syllogistic inference that applies to material of this kind? what is the *nervus probandi* in a dialectic syllogism?

There are two possible views—either that the principle of syllogistic inference is purely formal, deducible from the characteristic of thought as either affirming or denying in reference to a particular subject, and therefore capable of application either to probable or to necessary matter; or that the syllogism is explicable only as a form in which knowledge is established, and is applicable but *per accidens*, as one may express it, to probable matters. Under this second view, the possibility and reality of syllogistic inference would be traced to the correlative peculiarities of human thought and of the nature of the objects of thought, and it would follow that in strictness there is no dialectic syllogism. Such a conclusion at first sight appears to stand in sharp opposition to quite emphatic utterances of Aristotle; but if we suppose, for the sake of example, that a dialectic syllogism were framed, we should readily discern that the link of connection between data and conclusion, the *nervus probandi*, as it may be called, does not in fact differ from that involved in the apodictic syllogism. The merely probable character of the data prevents the conclusion from having a higher value than mere likelihood, but does not affect the chain of inference, which proceeds on assumptions identical with those involved in apodictic. Aristotle is chary of any examples of dialectic syllogism; and indeed, if one considers that all forms of modality are investigated in the general analysis of syllogism, it becomes difficult to see what specially distinguishes dialectic inference. It is not to be denied, however, that the

investigation of the grounds for the coexistence of dialectic and apodictic is incomplete in Aristotle, as it confessedly is in Plato.

Unless, then, it can be shown beyond possibility of question that Aristotle does lay down purely formal rules for syllogism, rules deducible simply from the fundamental axiom of thought—and the evidence on which such a view is based will be examined later—we do not obtain much light from the opposition between dialectic and apodictic. More important results, however, are gained when we consider the Aristotelian doctrine of genuine knowledge, of *ἀπόδειξις*, for, among the numerous elements that here fall to be noted, some are of quite general import, and apply to the whole process of the formation of knowledge.

13. Apodictic knowledge generally is definable through the special marks of its content. It deals with the universal and necessary, that which is now and always, that which cannot be other than it is, that which is what it is simply through its own nature. It is the expression of the true universal in thought and things, *τὸ καθόλου*. Further, as a method, *ἀπόδειξις* is characterised by the nature of its starting-point, and of the connecting link involved, as well as by the peculiarity of its result. It rests upon the first, simplest, best known, unprovable elements of thought, the *πρῶτα καὶ ἄμεσα*, which are not themselves in the strict sense matters of apodictic science, which are *ἀναπόδεικτα*. In all the intermediate processes of scientific proof there is involved generally this dependence upon previously established principles, and, when apodictic is taken in its ultimate abstraction, these previously established principles are seen to be the prior, ultimate elements, assumptions in thought about things, as one may provisionally describe

them. The peculiar connection involved is simply what we understand by the principle of syllogism. No syllogism is possible without the universalising element, the *καθόλου*, and knowledge in its essence is syllogistic.[1] The conclusion of the syllogism in which essential attributes are attached to a subject is the concretion or closing together of the two aspects of all thought and being, the universal and particular.[2]

The fuller explanation of apodictic thus refers us to three points of extreme importance in the Aristotelian theory of knowledge: the precise nature of the *καθόλου*, which presents itself as the characteristic feature of *ἀπόδειξις*; the relation of fundamental and universal in things on which the possibility of *ἀπόδειξις* is founded; and the forms of thought through which the universal and particular factors are subjectively realised. The three are most closely connected, and as they involve the main difficulties of the Aristotelian philosophy as a whole, a general treatment of them is indispensable. First then of *τὸ καθόλου*, the characteristic term in the explanation of knowledge. Of this term, as of others in the Aristotelian lexicon, the uses are various, more or less precise. In the less precise significance it is employed merely as equivalent to general or universal. Thus the universal

[1] *Cf. Topica*, pp. 164a 10.

[2] See specially *Anal. Pr.*, 67a 39 *sq.*, and compare the elaborate note of Kampe, *Erkenntnisstheorie des Arist.*, p. 220 (also p. 84). Grote (*Aristotle*, i. p. 263) remarks: "Complete cognition (*τὸ ἐνεργεῖν*, according to the view here set forth) consists of one mental act corresponding to the major premiss, another corresponding to the minor, and a third including both the two in conscious juxtaposition. The third implies both the first and the second." The connection between this and the Aristotelian doctrines of *νοῦς* in its relation to *αἴσθησις* will not escape attention.

judgment of the logical researches is λόγος καταφατικὸς ἢ ἀποφατικὸς καθόλου, *i.e.*, τὸ παντὶ ἢ μηδενὶ ὑπάρκειν. But there always underlies this vague significance a reference to the deeper doctrine according to which the *universal* is the more important element given in nature. For apodictic, then, which deals explicitly with this more profound sense, there is required a more stringent definition of καθόλου, and such is given with great precision by Aristotle. τὸ καθόλου is essentially double-sided. On the one side it is the universal of empirical knowledge, the generic or class universal —it is τὸ κατὰ παντός; on the other hand, it is the root or ground of the empirical universal—it is τό καθ' αὑτὸ καὶ ᾗ αὑτό,[1] that which is in, for, and through itself, the essential. Now the essential, καθ' αὑτό, is in the first place, either that which enters into the being and notion of a thing as a necessary prerequisite (for example, *line* is a necessary element in the being and notion of triangle), or that which is the necessary basis of an attribute (*e.g.*, *line* in reference to *straight* and *curved*), or in the second place, that which is as subject only and not as predicate, or finally that which is *per se* the cause or ground of a fact or event.[2]

Thus the function of thought (of apodictic) is the exposition with reference to a determined class of objects of all that necessarily inheres in them, on account of the elementary factors which determine their existence and nature. Real things, individual objects, are the basis of

[1] *Anal. Post.*, 73b 26, καθόλου δὲ λέγω ὃ ἄν κατὰ παντός τε ὑπάρχῃ καὶ καθ' αὑτὸ καὶ ᾗ αὐτό. See *Index Aristotelicus*, *s.v.*, pp. 356-57, and on καθ' αὑτό compare Heyder, *Method. d. Arist.*, 310 *n.*, and Bonitz, *Com. in Met.*, pp. 265-66. On the distinction between καθόλου and γένος, see Bonitz, *Com. in Met.*, pp. 299, 300; Zeller, *Ph. d. Gr.*, ii. 1, p. 205, 206.

[2] *Cf.* Prantl, *Ges. d. Logik*, i. 121, 122, who has rightly placed the function of καθόλου in the foreground.

all knowledge, but in these individuals the elementary parts, causally connected, and leading to ulterior consequences, form the general element about which there may be demonstrative science. Thought which operates upon them does so, as we have already seen, under the peculiar restriction of its very nature, as the subjective realisation of the notion of things; and the principles expressing this restriction, the logical axioms, may be appealed to if demonstration be opposed groundlessly; but these axioms do not enter into the process of demonstration. "When the apodictic process has attained its end, that is, when all the universal propositions relating to a given class, with insight into the necessary character of the predication in each case, have been gathered up, then the καθόλου of knowledge in respect to that class has been realised." [1]

14. Probably the example of apodictic which Aristotle bears chiefly in mind is mathematical science, and in his treatment of the characteristic marks of this doctrine most of the peculiarities of apodictic occur. In mathematical science abstraction is made of the material qualities of the things considered, of those qualities which give to them a place as physical facts; but the abstracta are not to be conceived as entities, self-existing. They are not even to be conceived as existing only in mind, as ideal types; they truly exist in things, but are considered separately (ἐξ ἀφαιρέσεως). The first principles of mathematical science are few and definite, and the procedure is continuously from the simple and absolutely more known to the concrete and relatively more known. As in proof generally, so in mathematical demonstration, an essential quality (συμβεβηκός καθ' αὑτό) may be proved of a subject, and yet

[1] Prantl, i. 126.

such quality may be still accidental, *i.e.*, not predicated of the subject on account of its generic constituent marks, but capable of being deduced from the constituent mark of that which enters into the subject, as, *e.g.*, a given figure's exterior angles are equal to four right angles. Why? Because it is an isosceles triangle. Why has an isosceles this property? Because it is a triangle. Why has a triangle? Because it is a rectilineal figure. If this reason is ultimate, it completes our knowledge, καὶ καθόλου δὲ τότε.[1] Thus the range of mathematical proof extends from the πρῶτα, the original definitions, which at the same time assume the existence of the things defined, through the determinations καθ' αὑτά to the qualities (συμβεβήκοτα), which can be shown to attach to their subjects, to be in a sense καθ' αὑτά, while a continuous series of middle notions, concerning which there cannot be much ambiguity, effects the transition.

Moreover, in mathematical science, one can see with the utmost evidence the correlation of reason and sense, which will presently appear as a fundamental factor in Aristotle's general theory of knowledge. The πρῶτα are not to be conceived as innate or as possessed before experience. They are seen or envisaged, intuited in perception by νοῦς, and induction here as elsewhere is the process by which perceptions are gathered together for the reflective and intuiting action of νοῦς. In the mathematical individual, more evidently than in any other case, is visible the union of thought and sense. The demonstration which employs a diagram does not turn upon any properties of the diagram which are there for sense only, not for reason, but upon the general elementary relations contemplated in

[1] *Anal. Post.*, i. 24, 86a 2.

thought.[1] In mathematical development, that which is potentially contained in the ὕλη νοητή on which mathematical thinking operates is brought forward into actuality by the constructive processes through which the proof is mediated, and the potential knowledge contained in the intuition of mathematical elements becomes actual through the process of constructive thought.[2]

Finally, the relation of pure mathematical reasoning to that found in sciences generically one with mathematics, *e.g.*, optics, astronomy, harmonics, &c., furnishes an interesting example of the relation between reasoning based on fact and on causal ground.[3]

15. The process of ἀπόδειξις generally and of mathematical demonstration in particular has brought into clear light the prominent characteristic of knowledge according to the Aristotelian view. Knowledge must always be regarded from two sides, as having relation to the universal,

[1] *Cf.* the passage from *De Memor.*, p. 450, quoted by Brandis, *Aristoteles*, p. 1133—*συμβαίνει γὰρ τὸ αὐτὸ πάθος ἐν τῷ νοεῖν ὅπερ καὶ ἐν τῷ διαγράφειν· ἐκεῖ τε γὰρ οὐθὲν προσχρώμενοι τῷ τὸ ποσὸν ὡρισμένον εἶναι τὸ τριγώνου, ὅμως γράφομεν ὡρισμένον κατὰ τὸ ποσόν· καὶ ὁ νοῶν ὡσαύτως, κἂν μὴ ποσὸν νοῇ, τίθεται πρὸ ὀμμάτων ποσόν, νοεῖ δ' οὐχ ᾗ ποσόν. ἂν δ' ἡ φύσις ᾗ τῶν ποσῶν, ἀόριστον δέ, τίθεται μὲν ποσὸν ὡρισμένον, νοεῖ δ' ᾗ ποσόν μόνον.* *Cf.* also *Met.*, vii. 10 and 11. Aristotle's view strongly resembles, in this point at least, that of Kant.

[2] See *Metaph.*, ix. c. 9, p. 1051a. Some interesting remarks on the process of mathematical construction and its relation to syllogistic proof will be found in Ueberweg's *System der Logik*, § 101, p. 273.

[3] See generally *Anal. Post.*, chap. 13. Of Aristotle's views on mathematics the best expositions seem to be those of Biese (*Ph. d. Arist.*, ii. 216-34), Brandis (*Aristoteles*, pp. 135-39, and *Aristot. Lehrgebäude*, 7-11), and Eucken (*Methode d. Arist. Forschung*, pp. 56, 66).

and as bearing upon the particular.[1] It is in itself the union of the general and the particular, of the universal and the individual. This fundamental notion of knowledge is not only the integral element in the Aristotelian theory of science, but also the guiding principle in his scientific method.[2] In all cases we require to keep in mind the necessary correlation of the particular facts and the general grounds, the multiplicity of effects and the unity of cause. The one element is not apart from the other. Universals as such are of no avail either as explanations of knowledge or as grounds of existence. Particulars as such are infinite, indefinite, and incognisable. Only in the union of these—a union which objectively regarded is the combination of form and matter, of potentiality and actuality, of genus and ultimate difference, subjectively is the combination of the data of sense, imagination, and intuitive faculty of reason—is knowledge possible. And the methods by which knowledge is formed in us regarding things exhibit the same twofold aspect. Syllogism as the form of the process from generalia to the determination of attributes of the individual subject, induction as the method of procedure from the vaguely apprehended individuals to the generalia or principles, alike, when analysed, exhibit the conjunction of the universal and particular.

But while this general view is undoubtedly to be ascribed to Aristotle, it is no less undoubted that grave difficulties are felt when his various utterances on the fundamental points of the doctrine are placed side by side and the attempt made to extract from them a harmonious and con-

[1] *Cf.* specially *Anal. Pr.*, ii. 21.

[2] This is excellently put by Eucken, *op. cit.*, pp. 44-55.

sistent doctrine.[1] That some of these difficulties are due to the fragmentary condition in which the successive treatments of the question have come down to us may be allowed; but, as the question involved is in truth the cardinal difficulty of all metaphysical thought, it may well be said that a quite harmonious view is not to be expected; and in particular this may be said when one considers the doctrine of perception in which the metaphysical determinations of universal and particular come forward in subjective fashion.

16. Opposing throughout the Platonic doctrines of Ideas, separable from the objects known, and declaring that the assumption of such isolated forms not only involved contradictions but was of no service in solving the problems of generation and of knowledge, Aristotle is led to emphasise the individual as the ultimate fact in existence and cognition. Universals as classes have no separate substantive existence: they do not indicate the individual τόδε τι, but a property or quality common to many individuals, ποῖον τι; their function is predicative. No doubt they are οὐσίαι in a sense, for they indirectly refer to individuals—*i.e.*, one cannot overlook the closeness of connection between the individual things having essential attributes in common and the notion of these attributes.[2] The individual thing

[1] See specially the treatment by Heyder, *Methodol. d. Arist.*, pp. 140-216, which is most instructive and comprehensive. The commentaries of Bonitz and Schwegler on the relative portions of the *Metaph.* (iii. cc. 4 and 6, vii. and xiii. 10) should be consulted. Zeller (*Phil. d. Gr.*, ii. 2, pp. 300-313) brings out the fundamental difficulty, and notes some attempted solutions of it. Kampe (*Erkenntnisstheorie d. Arist.*, 160-170) lays special stress on the subjective or psychological aspect.

[2] It is probably the most helpful view, and one enabling us alto-

is the basis of all attributes, it is the underlying reality which presents itself in the natural process of becoming as the subject determined in existence, quality, quantity, relation, &c.[1] But what is the individual thing? It can hardly be said that to this Aristotle returns any single unambiguous reply; his utterances, in fact, disclose a real difficulty, and point to the presence of a twofold conception of the individual: the individual as the ultimate, unqualified, undetermined unit, the last result of abstraction; and the individual as the concrete thing, qualified and determined to the full extent by its generic and specific marks. With these diverse conceptions floating before him, now one, now the other becoming prominent according to the special problem in hand, Aristotle's expressions sometimes present apparently irreconcilable divergencies. The difficulty specially pressing upon him was one arising from the definition of knowledge. Knowledge is of the general and necessary; how then can there be knowledge of the individual? Knowledge is not a process capable of infinite regress; its principles are definite and its method determinate. But particulars are infinite; how then can there be knowledge of them?[2] Aspects of the same difficulty present themselves at every stage in which reference is made to the nature of ultimate parts or elements, as, *e.g.*, the parts of definition and of the definiendum. So far as solution is offered it is the following:—

The *subject* or *substratum* of predicates is certainly one mode of describing the ultimate fact in existence and

gether to reject the fancied opposition between the *Categoriæ* and the *Metaph.*, to regard δεύτεραι οὐσίαι as specially the concrete general notions, in respect of which there is always confusion possible between the thought-content and the real class referred to.

[1] See below, p. 176 *sq.*

[2] *Met.*, 999a 26, 1003a 5, and *cf.* xiii. c. 10.

knowledge. But this subject, as a concretum or *σύνολον*, contains in itself matter and form. Form when first analysed appears to consist of those very predicates which we have already seen to be secondary in nature, and when abstraction is made of them, there appears to remain nothing save undetermined matter. Now matter is precisely that which in itself is incognisable. The truth is our first analysis is imperfect. The connection of *ὕλη* and *εἶδος* in the *σύνολον* is not mechanical aggregation, nor is *εἶδος* to be identified with generic properties regarded as generic. The form is the intelligible universal element in the concretum; it is that which gives definiteness, actuality to the indefiniteness and potentiality of matter. It is the formal cause, the notional essence of the thing, and its perfect expression in thought is the definition, for in the definition the generic properties of the thing and its ultimate specific difference (*διαφορά τελευταία*) are the necessary elements. It is *notional essence, i.e.*, it is the unity of the essential properties as grasped by thought and apprehended as really existing.

The individual would thus appear in the Aristotelian metaphysic as the union of the universal and definite with the particular and indefinite, and in a sense as the final goal of the determining process of knowledge; for the *τι ἦν εἶναι*, which is the notion of *τόδε τι*, is expressed in definition, the last result of scientific knowledge.[1] Such

[1] Such a result, it appears to be said in the chapter of the *Metaphysics* previously referred to (xiii. c. 10), when supplemented by a special distinction, may yield a solution of the difficulty regarding knowledge as essentially general and things known as essentially individual. "Knowledge, like the act of cognising, is either in potentiality or in actuality. In potentiality, *i.e.*, in the aspect in which it resembles matter, itself universal and indeterminate, knowledge is universal and indeterminate; in actuality, as being definite and individualising, it is definite and of the individual." The passage

a conception, however, is not carried out consistently, and, in particular, fails to reconcile itself with the doctrine of the individual that comes forward, partly in the metaphysics, but mainly in what one might call the Aristotelian theory of knowledge.

17. It is not possible to hold questions of metaphysic strictly apart from those of theory of knowledge, and in Aristotle's treatment of the universal and particular we find that the main features of interest attach to the conditions under which an individual or general is cognisable. Now, throughout the analytical researches, the rhetoric, ethics, and generally the subordinate branches of philosophy, one notes an apparently well-defined significance attached to the individual. Τά *καθ' ἕκαστα*, the particulars of experience, present themselves as the first given data of knowledge, the basis upon which progress to principles or generalia is founded. Τὰ *καθ' ἕκαστα* are prior or simpler so far as our cognition is concerned; and arguments based on apprehension of them, arguments of fact or effect, are more persuasive and more easily grasped than arguments from principles or causes. Apparently, also, if we confined attention to some of the more direct *dicta* on this perplexing doctrine, we might assume that, according to Aristotle, knowledge was to be conceived as first ascend-

has never appeared very satisfactory to commentators. Doubtless we might interpret it freely in connection with the distinctions given below respecting knowledge and perception; but it is specially interesting to notice how this description of cognition as twofold, as of the indefinite, and so universal in one aspect and not in another, as of the individual, and so not universal in one aspect while most truly universal in another, applies to mathematical cognition as above sketched by Aristotle. — *Cf.* Brandis, *Aristotelisches Lehrgebäude* (*Ges. d. gr.-röm. Phil.*, iii.: 1), p. 9.

ing inductively from particulars to the universal, and then descending deductively from these. This, however, is an altogether inadequate view; and hints are supplied which, though not enabling a quite coherent doctrine to be formed, yet enable us to understand somewhat more clearly not only the special difficulty experienced by Aristotle, but also his method of solving it. Of those hints but two groups can be here taken into consideration.

(1) The particulars, *τὰ καθ' ἕκαστα*, are objects of perception, *αἰσθητά*. It has already been seen that *τόδε τι* involves form and matter, and is the concretum of both. Perception then might be supposed to be a complex process, involving in some way apprehension of form and receptivity of matter, and containing subjectively both. Aristotle's analysis of perception is far from complete, but we are able to say with respect to it that in his view *αἴσθησις* is not to be regarded as a simple process, directly receptive of the individual as such. Such a view of perception is altogether foreign to the Aristotelian psychology in which the subjective processes of mind, with the objective system of things, are conceived as mutually involving and involved, in which the lower faculties, as we may call them, potentially contain the higher, in which the subjective process of knowledge is the evolution of that which is contained in an undetermined, indefinite form in the lower stages of apprehension. Thus Aristotle not only marks that sense-perception as a whole is apprehensive of the *καθόλου*, while separate acts of perception are apprehensions of the individual, but he distinguishes in perception aspects or stages which, in more modern phraseology, might be described as (*a*) receptivity of impression, (*b*) intuition of sense forms, (*c*) classification with representations of past experience. In each sense-perception there is apprehension of the proper sensible,

and also apprehension of the common forms of sense intuition, and finally, there is apprehension of the *αἰσθητὸν κατὰ συμβεβηκός*, which is virtually recognition of the individual as representative of something else. Perception, then, one may say, is used both in a vague sense as marking, with respect to the genesis of knowledge, the apprehension of facts, and in a more exact sense, as a compound involving not only receptivity but also the cognising power *par excellence*, *i.e.*, *νοῦς*. Only by the presence of *νοῦς* is light given to the processes of perception.

(2) Quite in accordance with this is the Aristotelian view of the apprehension of principles or generalia. *Καθόλου* is nothing *per se;* it is only as related to particulars. In no way, then, save in and by apprehension of particulars, can the universal be reached. Were it not for the natural power of retention, the collecting of similars in experience, and the formation of a permanent representation, the intuiting power of *νοῦς* would have no object. But the two sides are not to be conceived as isolated. They are only in correlation, and one can thus understand how Aristotle should both assert that principles are reached by induction, and that *νοῦς* alone is the source of principles. The ultimate principles are seized or apprehended by *νοῦς*, and in respect of them the form of knowledge does not take the form of a judgment, which may be true or false. The principles are either apprehended or not apprehended. All intermediate truths, capable of proof by reference to even higher principles, form the matter of apodictic, that is to say, of *νοῦς* in its twofold aspect as at once apprehensive of universals and of particulars. Deductive proof and induction are two strictly correlated processes.

Although this general view undoubtedly represents a true Aristotelian position, yet there remain a sufficient

number of expressions of opposed tenor which point to the existence of a real difficulty and of an ambiguity in Aristotle's conception of the individual as known to us. For in the theory of the formation of knowledge, induction is continuously defined as starting from the individual definite thing known, the part, and it is explicitly stated that knowledge of the individual does not imply knowledge of the general, that the one is an affair of sense-perception, the other of intellect.[1] Αἴσθησις is with equal explicitness said to be of the universal and not of the universal.[2] It is pointedly declared that induction rests on *αἴσθησις*, while at times the two processes seem to be opposed. Finally, the process by which a universal is gathered from induction leaves it doubtful to what extent the generalising force of *νοῦς* is to be assumed as present at all stages of the process. For we are said not to have the universal immediately in the particulars given, but to hunt it out (*τὸ καθόλου θηρεύειν*); and in those cases in which the connection, necessarily expressible in a general law, between two facts is actually perceived, it is declared that we do not see (perceive) the universal, but have the universal from the perception (*ἔχοντες τὸ καθόλου ἐκ τοῦ ὁρᾷν*).

These discrepancies of statement arise in part from the extreme difficulty of adequately expressing the constant correlation of universal and particular, that is, of expressing in all cases so that the conjunction shall be kept in mind, and in part form a real philosophical ambiguity in Aris-

[1] *ὁ δὲ ταύτην ἔχων τὴν πρότασιν* (viz., that an isosceles triangle has its angles equal to two right angles) *τὸ καθόλου* (viz., that all triangles have this attribute) *οὐδαμῶς οἶδεν, οὔτε δυνάμει οὔτ' ἐνεργείᾳ· καὶ ἡ μὲν καθόλου νοητή, ἡ δὲ κατὰ μέρος εἰς αἴσθησιν τελευτᾷ.—Anal. Post.*, 86a 28-30.

[2] *οὐ γὰρ ἦν τοῦ καθόλου αἴσθησις.—Anal. Post.*, 88a 2. *ἡ δ' αἴσθησις τοῦ καθόλου ἐστίν.—Anal. Post.*, 100b 17.

totle's doctrine, an ambiguity which is not found only in his system. *The* universal which is implicated in the particulars is not one only, but several. For example, in the case used by Aristotle of the isosceles triangle, the universal, triangle, is not in this respect implicated that the proof is seen to involve reference to the wider class; but, none the less, since the actual knowledge is not of the given sense fact, an isosceles triangle drawn before one, but of that which is signified by the figure, there is *a* universal present—viz., isosceles triangle. So if we take, for example, effects presented in experience and apprehended, as Aristotle would say, by αἴσθησις, it is not indispensable for our apprehension of them that the notion of the specific cause giving rise to them should be implicated in turn. The universal, in this concrete sense, is present neither potentially nor actually. Nevertheless, each fact, as a phenomenon of apprehension, is only as a combination of general elements with particular. The progress of knowledge might with equal accuracy be described as a progress from the vague, indefinite universal to the precise determinate particular, or from the determinate particular to the more extensive universal. Accurate statement of this twofold nature of the elements of knowledge, and consequent formulation of the theory of knowledge so as to embrace both, we do not find in Aristotle, but we do find abundant hints from which the true view may be elicited.

18. If there is, then, ambiguity in regard to Aristotle's conception of the individual, one would expect to find similar difficulties in respect to the universal. Yet here, in virtue of the strong opposition to the Platonic theory of generic or class universals, a much more accurate and precise

determination of the fundamental notion is furnished by Aristotle. To him the universal as such is not the class, or common attributes as they may be gathered by observation, induction, and division, but the notion of the ground or reason, of these elements whereby each thing has its position defined in what may be called the intelligible system of things. That Aristotle succeeds in making quite clear this new and fruitful idea, that he distinguishes with sufficient care and precision between the subjective elements of the conception (the forms in which the notion is realised in our thought) and the objective or real causes by which the system of things is held together, we cannot affirm; but the formal subjective side of his doctrine is expounded with extraordinary sagacity, and lies at the very root of his theory of apodictic.

19. The characteristics of scientific knowledge have thus become evident. In each branch of knowledge there are involved, as before said, the specific genus or class, the attributes concerning which there is to be demonstration, and the common axioms or principles. Each branch, moreover, implies special principles, *ἴδιαι ἀρχαί;* there is no all-comprehensive science from which truths are to be deduced, and from the common maxims alone nothing can be inferred. *Ἀπόδειξις* involves principles, and starts therefore of necessity with what may be called definitions. Yet definitions are at the same time the final result of apodictic demonstration, and the original assumptions may be pushed farther and farther back till they appear as the *πρῶται καὶ ἄμεσοι προτάσεις* which are only apprehended by *νοῦς*. From this distinction between knowledge as completed and knowledge as in process of formation, as from the distinction between sciences of the same genus as more

or less general (*e.g.*, geometry and optics), there follow the distinctions between propositions necessary and propositions true ἐπὶ τὸ πολύ, between proof of fact and proof of essence, between deduction and induction, between syllogism as generic form of all proof, and the special type of syllogism in which completed knowledge is expressed.

We are thus enabled to reconcile what seem at first sight discrepancies in the Aristotelian doctrine,—as, *e.g.*, the insistence upon induction as furnishing the principles of reasoning (τὰ καθόλου) coupled with the attempt to show that induction too is a kind of syllogism; the explanation of proof as involving essence, coupled with the admission of syllogisms of fact; the treatment of propositions as necessary and contingent in themselves, coupled with the distinction between ἐπιστήμη and δόξα. In all forms of knowledge there is the twofold aspect, that which turns upon the essential connections, and that which refers to the isolated facts wherein such connections make their appearance. Syllogistic as formal analysis of what is common in all knowledge is one part of the all-comprehensive theory of knowledge, an integral but not a self-existing part.[1]

[1] The passages in which an apparently formal view of logical relations is expressed are mainly the following: *Topica*, i. chap. vi. (in which the fundamental logical forms of definition, genus, property, and accident are explained by reference to the coincidence of the spheres of subject and predicate in a proposition); *Anal. Post.*, i. chap. 26 (συλλογισμός ἐστιν, ὃς ἂν οὕτως ἔχῃ, ὥστε ἢ ὅλον πρὸς μέρος ἢ μέρος πρὸς ὅλον ἔχειν); *Anal. Post.*, ii. 3 (ἑτέρου δὲ ἑτέρα ἀπόδειξις, ἐὰν μὴ ὡς μέρος ᾖ τι τῆς ὅλης. τοῦτο δὲ λέγω, ὅτι δέδεικται τὸ ἰσοσκελὲς δύο ὀρθαῖς, εἰ πᾶν τρίγωνον δέδεικται· μέρος γάρ· τὸ δ' ὅλον); *Rhetorica*, i. 2, § 19. The general treatment of syllogism in *Anal. Pr.*, i. 4, as apparently resting on the principle of subsumption or logical substitution, has no precise bearing. But the use of the term ὅλον by Aristotle is not to be regarded as identical with its use by

20. The general idea of the Aristotelian analytic thus obtained does not require to be supplemented by any detailed survey of the logical system into which it is evolved; but a brief summary of the most important points and indication of the relation in which the parts stand to the whole may be of advantage.

The simplest form of knowledge, that in which being as true or false is apprehended, is the judgment. The consideration of the judgment is therefore the first part of the analytical researches. Here Aristotle distinguishes more accurately than any of his predecessors (indeed for the first time with accuracy) between subject and predicate as integral parts, symbolised by the noun and verb, and signifying the relations for us of things as appearing under the schemata of the categories. The material basis of the judgment, as one may call it, is the thing as an object of possible knowledge, *i.e.*, the thing as individual (and therefore as involving matter and form, the particular and the general), as qualified, specifically, in time, space, quantity, and relation, and existing as one mode in the universal nexus of potentiality and actuality. These metaphysical forms, and, specially, the deep-lying modes of potentiality

later logicians, and it is not rashly to be assumed that in Aristotle's view the only logical relation is that between genus and species. The distinction between extent and intent, on which later writers have laid stress, is never suffered in Aristotle to become a distinction in kind; the two elements, extent and content (*κατὰ παντὸς* and *καθ' αὐτό*), are always involved, and the difference is only in the process by which our knowledge is formed. Probably the relations of extent and content would never have been severed from one another had it not been for the error, almost a necessary failing in the attempt to treat formal logic systematically, of regarding notions and judgments as completely formed and defined products apart from the reasoning in which they appear (see, for a diametrically opposed view, Hamilton, *Lectures on Logic*, ii. p. 266).

and actuality, reflect themselves in the forms whereby subjectively knowledge is realised in us; and the resulting knowledge is conditioned partly by them, partly by the modes in which intellect as a reality is developed in us. The proposition has necessarily a reference to them; and thus, alongside of formal distinctions between universal, particular, singular, and indefinite judgments, we have the distinctions between necessary, contingent, and possible, which appear partly as given qualities of the judgment, partly as representing differences in the conditions of knowledge, partly as referring to differences of subjective apprehension.

The essence of the judgment as the apprehension of truth or falsehood consists in its twofold aspect as affirmative and negative, the former of these in a sense prior and better known, but the latter no less necessary, and both referring to objective relations of things. The affirmative and negative character of judgments, the essential ἀντίφασις of human thought, is further defined in reference to (*a*) the quantitative distinctions already recognised (the doctrine of logical opposition), (*b*) the distinctions of necessary, contingent, and possible, which are rightly regarded as real matters *about which* the assertion is,[1] and (*c*), consequent on this, the opposition of modal judgments.[2]

[1] On this account the *modality* is affirmed not to attach to the copula; thus the opposite of "it is necessary-to-be" is "it is not necessary-to-be," and not either "it is necessary-not-to-be," or "it is not-necessary-to-be."

[2] There are obscurities in Aristotle's doctrine of modals which remain even after Prantl's laborious treatment (*Ges. d. Logik*, i. 104-82). A careful survey is given in Rondelet, *Théorie logique des propositions modales*, 1861. The definitions of ἐνδεχόμενον and δυνατόν, which have given rise to much diversity of opinion (*cf.* Prantl, i. 167 *sq.*, as against Waitz, i. 376, and Bonitz, p. 387), are excellently dealt with by Ueberweg, *Logik*, § 69.

Propositions as integral parts of knowledge turn upon the ultimate relations of things known. The distinctions between first principles and deduced truths, out of which the theory of proof is developed, themselves rest upon those distinctions which have been already noted in treating of apodictic. Syllogism as the form by which the general and particular elements are mediated and conjoined is therefore of universal application, and may be analysed formally.[1] The various modes in which syllogistic inference, pure or modal, the main types to which these modes may be reduced, their relations to one another, and the general laws implied in them, are worked out in a fashion which does not admit of any brief statement. The conclusion unites the elements which in isolation appear in the premisses, and is, in a sense, the complex or organic whole unfolded in the syllogistic form. To every syllogism three things are necessary, the presence of a positive element, universality in one of the premisses (resting, as above shown, on the recognised property of all proof as involving a general fact), and *consequence*, or necessary connection between conclusion and premisses. Now from this third element there follow certain interesting deductions. The necessity of consequence rests on the very nature of syllogistic thought, and if each syllogism be taken as it stands, as a simple unit, no further inquiry is needful. But the character of the premisses in themselves may be taken into account, and we then discover that syllogism proceeds continuously on the assumption that the general law of syllogistic proof is in the special case realised. It need

[1] In this sense only can we recognise the distinction between Aristotle's *Technik* and his idea of *Apodiktik* on which Lange (*Logische Studien*, 1880) has laid so much stress. What underlies Aristotle's treatment must never be thrown out of account.

not be in fact realised. We may have premisses in themselves false, from which a true conclusion is reached, and the falsity of the premisses only becomes apparent when they are themselves treated as conclusions of a possible syllogism, and so the regress made towards ultimate principles.

Syllogistic form, in short, is the hypothetical application of the general rule of necessary connection between ground and consequent. If A (the premisses), then B (the conclusion). Quite possibly, then, we may have, in syllogistic form, conclusions drawn from premisses not *ἀναγκαῖα* but only *ὡς ἐπὶ τὸ πολύ*. Science and opinion (*δόξα*) are equally sources of propositions or premisses. If formal consequence be united with real uncertainty of matter, there arises a syllogism in character dialectical. Were the real uncertainty overlooked, the syllogism would be sophistic in character. Dialectical reasoning, then, dealing with the stage beneath science, may be of service, not only for practice in distinguishing true and false, but as bringing the particulars of each branch of knowledge into closer relation with the first principles special to that branch.[1] For wherever the particular element as such, the transitory and material, is present, there room is left for opinion, and reasoning is possible, not of the particular as such, but in so far as the particular manifests an underlying universal.[2] The processes of dialectic reasoning thus resemble very closely those modes by which the empirical detail, the region of given fact, is treated—viz., induction, example, use of signs and probable indications. For the universal has always its empirical side, and the complete process of

[1] *Topica*, i. 2, §§ 3-6.

[2] On this distinction *cf.* Kampe, *Erkenntnisstheorie d. A.*, pp. 252, 253; Heyder, *Method. d. A.*, p. 322.

scientific proof is a final result for which the way may be prepared by treatment, according to scientific form, of the empirical fact. There are syllogisms of fact as well as syllogisms of reason or ground, and the reason or ground becomes apparent through knowledge of the fact. Occasionally indeed the fact and ground are so immediately connected that transition from one to the other may be at once effected, but generally this is not the case.

Of these intermediate forms of reasoning, the only one calling for comment is induction, of the nature of which something has already been said. The obscure chapter in which the formal analysis of induction is undertaken, a chapter which has much exercised the ingenuity of commentators,[1] presents difficulties of various kinds. An opposition is indicated between syllogism and induction, yet induction is treated as a kind of syllogism; that is, freely interpreted, induction is so analysed as to show that in it, also, there is the union of general assumption and particular detail which is characteristic of syllogistic reasoning. Further, Aristotle seems to waver between induction as a kind of inference, through which we arrive at general principles, and as a species of proof, and his teaching is therefore perplexed by the want of some clear statement regarding a difficulty in the theory of induction, which is still far from perfect solution. For, according to Aristotle, induction as such, starting from the particulars of sense, and proceeding by comparison of similar cases and enumeration of all the similarly constituted members, never, even when the enumeration is complete, attains to probative force.[2] It

[1] *Anal. Pr.*, ii. 23. *Cf.* Whewell, *Camb. Phil. Soc. Trans.*, vol. ix., 1856 : Hamilton, *Lectures*, ii. 358-62 ; Grote, i. pp. 268-74 ; Heyder, 216-26 ; Kampe, 189-92.

[2] On induction and recognition of similarity, see *Topica*, i.

is still a syllogism of fact, not of ground or reason ; there is a distinction of kind between the survey of empirical detail, even when complete, and the assertion of causal connection between the characteristics of the class and its deduced properties.[1] Thus, perception of the law (τὸ καθόλου) from induction is a kind of new element in the process ; it is recognition *by means of* the empirico-critical survey which is the essence of induction.[2] Induction makes clear only, and does not prove.[3] If we interpret according to more modern phraseology, this peculiarity may be expressed as the distinctive feature of inductive research based on facts or effects. We do not regard the inquiry as terminating in the establishment of a law until it is possible to reverse the process and show that from the surmised cause the effects do actually follow. Otherwise we have a conclusion of "coexistence" merely—an empirical rule or generalisation.

If, bearing in mind these sources of difficulty, and also the correlation which for Aristotle always obtains between empirical details and grounds of reason, we consider the example given in the obscure chapter before us, some light may be cast on the exposition there given. The example selected is one touched upon by Aristotle in other two

chap. 18, p. 108b 7 *sq.*; viii. chap. 1, § 14, and chap. 8, § 1 (in these last similarity is viewed as being wider in scope than the basis of induction). That induction implies a complete enumeration, see *Anal. Pr.*, ii. chaps. 23, 24 ; *Anal. Post.*, ii. chap. 7, § 1. That induction even when complete is not demonstrative, see *Anal. Post.*, i. chap. 5.

[1] On this distinction see mainly *Anal. Post.*, ii. 13, where a very fine description of deductive and inductive proof occurs.

[2] Compare the passages above noted, and see the curious expression used in the discussion regarding the relation of universal and particular in *Anal. Pr.*, ii. 21, p. 67a 22 *sq.*

[3] *Anal. Post.*, ii. 5, p. 91b 34, οὐδέ γὰρ ὁ ἐπάγων ἴσως ἀποδείκνυσιν, ἀλλ' ὅμως δηλοῖ τι.

pasasges, in the treatise *De Partibus Animalium*, and in the *Post. Anal.*, ii. 18.[1] As regards the first of these, reference is desirable only to bring out the fact that causal nexus is the καθόλου in question; the second is of the utmost importance as clearing up what has always seemed an obscurity in the account of the inductive syllogism. In the chapters 16-18 of *Anal. Post.*, ii., Aristotle considers the relation of cause and effect as the essential basis of proof, and he points out with much clearness the difference between the fact as cause of knowledge and the cause as ground of existence and proof. In some cases cause and effect are so united, so reciprocate, that we may infer from one to the other. But the doubt arises, may there not be more than one cause for any given attribute? in which case all such inferences from effect must become problematical. Aristotle's solution is remarkable, both in itself and in its bearing on the inductive syllogism. Suppose the attribute β is found in all individuals of a class A, and also in individuals of class B, C, &c. In order to discover the cause, investigations must be carried on until we have a defined number of classes A, B, C, &c., in all of which β is found, and which comprehend all cases of the presence of β. Then that which is also common to A, B, C, &c., may be regarded as the cause of β, say, *e.g.*, an attribute α. If this attribute α be really the cause of β, it will enter into its definition; it will be its definition. There might, however, be a connection of α and β of this universal and reciprocating kind, and yet α might not be the cause in question; it might be only a fact from which β could be inferred; the real cause γ, which gives rise to α, lies in the

[1] *De Part. Anim.*, iv. 2. *Cf.* Hamilton, *Lect.*, iv. p. 358, *n.* On *Anal. Post.*, ii. 16-18, see the valuable summary by Grote, i. pp. 366-68.

background. Characteristic of causation, then, is constant reciprocal conjunction of facts. Even if it be admitted, then, that there may be more causes for a phenomenon than one, it will yet be true that each of these causes will be manifested in one class of phenomena where there will be the universal reciprocating coexistence that is characteristic of the relation in question. Thus the attribute longevity observable in quadruped animals and in birds may be due to different causes, *e.g.*, to absence of gall in the one case, to predominance of solid, dry matter in the other. But in each case there will be a definite species characterised by the constant conjunction of the cause and the causatum ; the whole class long-lived animals and the class gall-less animals will coincide.

Turning now to the chapter on inductive syllogism, we find induction defined as inference through the minor that the major belongs to the middle. Here evidently major and middle are regarded not as determined by form only but as naturally distinct, and we must assume that by middle term is to be understood the ground or reason of the attribute (major term) characteristic of a defined species or group (the middle term). Were our knowledge complete and scientific, we should be able to express this in apodictic form : whatever animal has no gall is long-lived ; man, horse, mule, &c., are animals having no gall ; therefore they are long-lived. The progress of knowledge, however, may be from the empirical details. We may have given to us the fact of the attribute, long-livedness, in the group of animals, man, horse, &c., and discover that these long-lived animals are also wanting in gall. If, then, in accordance with the rules above sketched, there can be discovered a reciprocating relation between want of gall in animals and long-livedness, if we can constitute a class distinguished by

conjoint presence of gall-lessness and longevity, we have the basis for an inductive proof. We may infer therefrom that gall-lessness is, *in this species*, the cause of longevity. Such a reasoning is founded on particulars given, and as the coexistence is given, the conclusion seems to be immediately drawn; there does not appear to be mediation or use of a middle term; nevertheless the middle term is implied, not in the supposition that the two classes reciprocrate, but in the transference from empirical coexistence to causal nexus.

Aristotle's mode of stating this argument has presented so many difficulties of interpretation that various emendations have been proposed. Grote, *e.g.*, who has not apprehended why the class long-lived animals should be taken universally,—"we are," he says, "in no way concerned with the totality of long-lived animals,"—suggests an emendation, which makes the essence of the inductive reasoning turn upon the extension of what we know regarding some gall-less animals to all of that class. But this is not the inductive step according to Aristotle. Induction has not to prove or assume that α and β, found coexisting in some members of the species, coexist in all of them; Aristotle takes this universal coexistence for granted as the basis of the argument. The inductive step is the transference from this universal coexistence to causal nexus. Apodictically, we should say, if α is the cause of β, then all A which possesses α possesses β; thus reasoning from cause to causatum. Inductively we say, all A which possesses α has β; therefore α is the cause of β.[1]

[1] The following is the relative portion of chap. 23 of bk. ii. of the *Anal. Pr.*: "Now induction and syllogism through induction is the process of concluding by means of the minor term that the major term is predicable of the middle" (that is to say, of concluding from

Induction, as dealing with particulars, starting with the sense data, and resting upon the more evident fact in order to point towards the essential ground or reason, is therefore more persuasive, more palpable, more adapted for popular

given facts that an attribute found in all of them is the effect of some other attribute also found in all of them). "For example, if B be the middle term, A and C the extremes, we show, by means of C, that A is predicable of B; for this is the inductive process. Thus, let A be long-lived; B, those wanting gall; C, individual long-lived, as man, horse, mule. Then A is predicated universally of C" (that is to say, the attribute A is found in all the examples before us), "for also that which wants gall is long-lived" (that is to say, as a given fact, gall-lessness and longevity in the species, group, before us coexist). "B, wanting gall, thus is predicated universally of C. If then B and C be reciprocating, if C do not extend beyond the middle term" (that is, if we do not find other animals than the long-lived animals enumerated which also are devoid of gall), "it is necessary that A should be predicated of B. For it has been shown previously that if two terms are predicable of the same third, and if the extreme reciprocate with one of these, then the other of those predicates will be predicable of that with which the first reciprocated; but it is necessary to know that C is the complex of all the individual cases." The last sentence is extremely hard to interpret. The expression *τὸ ἄκρον* occurring in it is generally the technical word for major term, but as in the syllogism before us the major term is one of the predicates, this signification would seem to contradict the words *πρὸς θάτερον αὐτῶν*. Hamilton reads *τὸ μέσον*, which makes the argument intelligible and coherent with the passage apparently referred to in *δέδεικται πρότερον*—viz., *Anal. Pr.*, ii. 21, p. 68a 21-25. Probably Aristotle uses *τὸ ἄκρον* here as equivalent to C, the *ἄκρον* through which the induction proceeds. According to the view taken above, the essence of the Aristotelian induction does not at all lie in the universalising of C, but in connecting in one proposition the attributes B and A found to coexist in the group C. There is thus in one sense no middle, for cause is not reached; in another sense there is, for C is the material link connecting A and B. Aristotle then might naturally use *ἄκρον* for C, and assimilate the process of induction to a syllogism in which there was reciprocation of terms. In fact, however, induction regarded after his fashion results merely in the constitution of a group or class characterised as possessing two attributes in common.

inquiries, and relatively more apparent. Syllogistic proof, on the other hand, is more stringent, and more efficacious in establishing a scientific conclusion or position.

Aristotle's mode of dealing with induction, in so far at least as any specific process is designated by that term, seems on the surface to diverge widely from modern logical theory, and we look in vain in his analytical researches for consideration of the methods of observation and experiment which has come to be recognised as the essential portion of a doctrine of inductive reasoning. Yet it may fairly be argued that in modern theories the term induction is used with great laxity, so as to cover either all processes connected with scientific method or some one special feature of scientific reasoning, and that the difference between the Aristotelian and modern views lies mainly in the matter, not in the form, of the process. For there are numerous hints in Aristotle respecting scientific procedure,[1] and, if we consider what is peculiar to modern views, we shall find that it consists mainly in the increased fulness and complexity resulting from long-continued scientific research. Our modern logic of induction has profited mainly by the general advance of scientific method, and tends to increase as these methods, by constant contact with facts, become more refined and accurate. The additional cautions or limitations which we now introduce into our statement of the principles of inductive research concern not so much the form of inductive proof as the character and modes of obtaining evidence which is to satisfy the canons or rules of proof. Such limitations become apparent only through

[1] See, for example, the discussions in *Topica*, i. 17-18; ii. 10-11, on similarity; in the *Post. Anal.*, i. 13, on deductive and inductive methods; in *Post. Anal.*, ii. 13, on the formation of definition; and in *Post. Anal.*, ii. 12, 14-18, on the relation of cause and effect.

actual scientific progress, not by analysis of the form of scientific proof.

21. To Aristotle, as has been above said, proof is essentially syllogistic or deductive in character. Not every syllogism is an apodictic proof, but all proof is syllogistic. For proof or adequate knowledge is reference of effects to their causes, and the cause is the general element, τὸ καθόλου, which forms the middle term in apodictic proof. Now proof by means of the cause or reason implies the existence of the cause; the inquiry why a thing is is useless unless we know or assume that the thing is. If it exists, then the cause or reason of its so existing is that which gives it a definite character or position; it is, in technical phraseology, the form of the thing. But the form of the thing, regarded apart from the material, accidental element essential to its concrete existence, is that which we express in a definition. Proof and definition are thus most closely connected. The *terminus* to which proof tends, not realised in all cases of proof but certainly in the most perfect, is the definition; and, besides, if we closely examine proof, and find that ultimately we can force back the chain of middle terms up to certain ultimate, primary universals, disclosed by νοῦς, and that the nature of these primary universals is stated in their definition, we see further that definition is connected with proof as the *terminus* from which proof starts.

The exposition of definition is thus the crowning portion of Aristotle's theory of apodictic method.[1] In it we have

[1] It does not seem necessary here to consider in detail the peculiarities of apodictic as these are laid out in the first book of the *Post. Anal.*, nor to deal with the doubts raised regarding definition and proof in the first chapters of the second book. The substance of

brought into close, though not explicit, relation, the fundamental notions on which his logic rests—the notions of the essence, universal, genus and specific difference. Definition, as concerned with that which is involved in demonstration, the ground or reason, is, in cases where the reason and consequent are separable, the sum of the demonstration; it is the compressed statement of the connection between a subject and the attribute demonstrated of it, *i.e.*, in a syllogism of the first figure, the major term.[1] Frequently a definition merely states the demonstrated attribute in relation to its subject, without indicating the rational link.[2] Such definitions, however, are defective, just as the conclusion of a syllogism, if taken *per se*, is defective.[3] A genuine definition is the statement of the essence, which in mediated notions is the cause or middle term of the demonstration, in immediate notions is directly assumed.[4] A

these difficult chapters can be readily summarised. If definition be taken as a finished result, it seems to stand in no relation to proof, and indeed it is hard to discover how it comes about at all. For definition supposes that which is implied in proof, the existence of the thing defined, and, moreover, it is in a special sense a unity, containing no distinction of subject and predicate, whereas such distinction is of the very essence of a demonstrated proposition. Neither in province, nor in method, nor in result do definition and proof coincide. All this follows, however, from an abstract separation of the form or essence of the thing defined from the concrete nature of the thing. The essence is not to be taken apart; the definition does not pre-exist as a given fact. The essence is the reason of the fact, and is only discoverable when there is the recognised distinction of fact and reason of the fact. We must consider definition in the same manner as being involved in and resulting from the genesis of scientific knowledge.

[1] ἀπόδειξις θέσει διαφέρουσα, *Anal. Post.*, i. 8, p. 75b 32.

[2] συμπέρασμά τι ἀποδείξεως, *ibid.*

[3] *De Anima*, ii. 2, p. 413a 13 *sq.*

[4] ὁ δὲ τῶν ἀμέσων ὁρισμὸς θέσις ἐστὶ τοῦ τί ἐστιν ἀναπόδεικτος, *Anal. Post.*, ii. 10, p. 94a 9.

merely nominal definition or explanation of what a name signifies is but a preparatory stadium in the progress towards real, genetic definition.

Definition, then, like demonstration, rests on the essential or rational ground, the notion of the thing. The rational ground or notion has its empirical aspect; it determines a class, and thus, just as in demonstration we may have forms of reasoning based primarily on the empirical details, so in framing definitions we may proceed from the empirical class, and may formulate rules for defining which bear special reference to the genus or body of individuals. In such procedure there is always involved the general idea of the essence or notion as the determining universal, and without this general idea the subsidiary methods, induction and division, do not yield scientific definition.

To frame a definition, then, *i.e.*, to discover the elements whose combination as an essential unity makes up the notion of the things defined, we select the predicates belonging to the things in question, but also attaching to other species of the same genus. The combination of such predicates which is not found in any other species, which is, therefore, reciprocable with the essence or form of the species, is its definition. The definition, therefore, contains the genus and the specific attribute (or combination of attributes). Of these elements, the genus is the least important; the truly essential factor is the specific difference, and, in order that our definition should be ultimate, we must follow out the line of specific difference by which a genus may be divided until we reach a final, irreducible characteristic or group of characteristics, constituting a lowest species (or natural kind, if one were to employ a term made current by J. S. Mill).

The systematic following out of the specific differences is

logical division; the critical comparison of points of similarity in species of the same genus, so as to obtain a higher generality, has no special title accorded to it, but it resembles the Socratic and Platonic induction (*συναγωγή*). Division preceeds on the oppositions actually found in nature; and though, doubtless, the division by dichotomy has formal advantages, it has not, as a process of real cognition, any supreme value. The negative as such is the inconceivable, and presents nothing for cognition.[1] And division is not dependent on exhaustive knowledge; it is not necessary that, in order to recognise A as distinct from B, we should know the whole universe of possible objects of cognition. A and B may be recognised as identical or distinct in essence, even though they at the same time possess distinct or identical accidental marks. Knowledge, in other words, turns upon the essential, not upon the numerical universal.[2] It is only needful, then, that in the systematic process of indicating the elements of definition, all must be included that concern the essence, that the order must be strictly from determining to determined (or from more abstract or general to more concrete or special), and finally, that the enumeration be complete. The final division or species reached is the notion of the thing, and its expression is the definition.

22. The analytical researches thus manifest themselves as a real theory of knowledge and as forming an integral

[1] Just as the *ὄνομα ἀόριστον* is said to have no significance save as the summary of a proposition, while a negative proposition has significance only in regard to the corresponding positive.

[2] The reference is to a theory advanced by Speusippus; see Prantl, i. 85. Aristotle here touches on a logical problem which has troubled many logicians. It is the same difficulty that arises when the question of plurality of causes is considered.

part of the Aristotelian system. Logical relations are throughout conditioned by the characteristics of the Aristotelian metaphysical conception, and the distinction of the formal or technical from the real in cognition has no place in them. No point is more frequently insisted on by Aristotle than the impossibility of deducing any scientific principles or results from the fundamental axiom of thought, the law of non-contradiction. In the Aristotelian system this axiom appears simply as the generalised expression for the peculiar characteristic of thought, its potentiality of truth or falsehood. Such potentiality accompanies thought throughout, and is the mark of its subjective character, but the actuality of thought is something quite distinct, and is only realised through the various processes whereby the world of fact is apprehended. Beyond a doubt knowledge has a general aspect; and there is thus possible a general theory of knowledge, but this is not to be regarded as merely a development from the fundamental axiom of thought. It is the general statement of what constitutes actual cognition, and thus refers on the one hand to the ultimate properties of that which is to be known, on the other hand to the qualities of knowledge as a subjective, though not the less real, fact. For to Aristotle subjective has not the sense which it may be said to have assumed in modern logic, mainly through the Kantian analysis. The activity of thought which realises itself in the consciousness of the individual is not a mere formal process of apprehension, mirroring or depicting reality that is totally distinct from it. It is a reality, one aspect or phase of the total sum of things, and its development is a real process correlative with the development inherent in things as a whole.

At the same time it is impossible to overlook the difficulties which attach to the Aristotelian conception,

and the consequent obscurities or perplexities in his logical researches. To remain always true to the fundamental conception of thought as one factor or phase in things, to trace its forms in such a mode as never to lose sight of its essential correlation to the development of reality, is in itself the hardest task for any thinker, and presupposes a more completed metaphysic than is to be found in Aristotle. Some of these difficulties may be briefly noted, as they form the turning-points of certain later doctrines. The judgment or proposition is taken as the initial, the simplest phase of the activity of thought, and so as having the simplest relation to things. But the distinctions of things which are subjectively seized in the judgment are too much regarded as given facts, and Aristotle is thus involved in a difficulty respecting the import, the truth or falsity, of the judgment. The presence of this difficulty is specially discernible when he attempts to deal with the temporal reference in the judgment, with the doctrine of opposition, and with the nature of modality. Thus, he notes that the verb, the essential part of the predicate, has a temporal significance, but he also notes that in universal judgments there is no reference to any specific time, and also that the copula, the verb *is*, has no existential meaning. He is thus driven to the enunciation of a view, common among recent logicians, that the judgment is a reflective or critical act, pronouncing on the truth or falsity of a contemplated separation or conjunction of facts, while, on the other hand, the very contemplation of conjunction or separation has appeared as the essence of the judgment. So, in dealing with opposition, he distinguishes contradictories from contraries, and is inclined to refer the second to the given nature of facts, wherein extreme oppositions of members falling under the same genus are presented. Modality, likewise, he treats

confusedly, for the assignment of the modal relations to the predicate does not sufficiently determine their place in a theory of judgment, nor explain the relation in which they stand to the judgment as the simplest activity of thought.

Further, in dealing with the quantity of judgments, Aristotle is perplexed by his own theory of what constitutes generality. He is compelled to throw together universal judgments of a totally distinct kind—empirical and rational, as one may call them,—and though the underlying view that empirical universality is the expression of, and is dependent on, rational connection is made sufficiently clear in the doctrine of proof, it is not carried out to its consequences in the doctrine of judgment. Finally, to note only the crowning difficulty, the theory of proof and of definition turns upon the nature of the essential connection of attributes in a subject, but the explanation of essence is precisely the lacuna in the system. Indications of a theory of essence are not wanting, but it does not seem possible so to unite them as to form a consistent whole. The greatest obscurity still hangs over the fundamental part of the system, the nature of the πρῶτα which are apprehended by νοῦς, of the specific relation of attributes καθ' αὑτά to their subjects, and of the ἴδιαι ἀρχαί from which particular sciences start. That the πρότασεις ἄμεσοι, so frequently adduced as integral parts of proof, are analytical judgments[1] cannot be accepted without such qualifications as to render the use of such a term misleading; but what their precise nature is remains in the Aristotelian system undetermined.

[1] As Zeller will have it; see *Ph. d. Gr.*, ii. 2, 191, *n.* Doubtless Aristotle does define an essential attribute as being one contained in the subject or one of which the subject notion is an integral part, but this relation of *entering into the definition* is not to be identified rashly with the modern view of the analytical relation of subject and predicate.

III

LOGIC FROM ARISTOTLE TO BACON AND DESCARTES

23. The long history of philosophic thought from Aristotle to the beginning of the modern period furnishes no new conception of logic so complete and methodical as to require detailed treatment, but exhibits alterations in special doctrines, additions, and new points of view numerous enough to account for a certain radical change in the mode of regarding logic which is, for our present purpose, the only interesting feature. This change may perhaps be expressed not inaccurately as the tendency towards formalising logic. Gradually logical researches came to have their boundaries extended in one way by the introduction of new matter, and narrowed in another by restriction of logical consideration to one special aspect of knowledge. Much in the history of this movement still remains in obscurity, but the general result is sufficiently clear.

The periods into which the historical development of logic throughout this long interval may be naturally divided, with their main characteristics, are the following :—

(1) *The Peripatetic School,* represented by Theophrastus and Eudemus, following in the main the Aristotelian

tradition, but deviating in certain fundamental respects, and on the whole treating the matter of logical research as though it were separate from and independent of the theory of knowledge as a whole. To this school is due the distinct recognition of the hypothetical and disjunctive proposition and syllogism, and the more complete enumeration of the possible valid modes of categorical reasoning. In both cases the additions are made to turn upon purely formal considerations. The hypothetical and disjunctive judgments are treated as given varieties, to be discerned in ordinary language and expression, not as resting upon any fundamentally distinct principle or activity of thought.[1] The addition of five indirect moods to those recognised by Aristotle as belonging to the first figure proceeds on the purely formal ground of difference in position of the middle term in the two premisses.

(2) *The Epicurean and Stoic Logics.* — Of these the Epicurean presents no points of interest. Logic, in their conception, was merely a practical theory of knowledge. The Stoic logic, on the other hand, is the first example of a purely formal doctrine based on and associated with a thoroughly empirical theory of cognition. In essence the Stoic doctrine is identical with that of Antisthenes, above noted, and it is interesting to observe that, under the purely nominalist theory, logic becomes almost identical with the doctrine of expression, or rhetoric. The theory of naming, and that of the conjunction of names in propositions, are the fundamental portions of the body of logic. Naturally

[1] The nature of hypothetical inference and its law are recognised with the greatest distinctness by Aristotle. From his theory of essence as causal nexus, any distinction of kind between an apodictic (categorical) syllogism and a hypothetical of the type contemplated by later logicians was impossible and needless.

the Stoic logicians tended to increase the bulk of logic by introducing numerous distinctions of language, and by signalising varieties of judgment dependent on varieties of verbal expression.

(3) *The acceptation of Logic among the Romans.*—Here there must be distinguished the quasi-rhetorical logic, such as is found in Cicero, which is altogether Stoic in character, and the Aristotelian logic, as developed by Boetius with the additions of the later commentators. In Boetius one notes specially the technical or formal character of the treatment, which was of special importance historically, from the fact that the earlier scholastic writers derived their main knowledge of logic from certain of the treatises of Boetius.

(4) *The Scholastic Logic.*—On the details of the scholastic logic it is not necessary to enter, but there must be noted the following points as of interest in determining what may well be called the current conception of the Aristotelian logic in modern times. The earlier scholastics, in possession of but few of Aristotle's writings, added nothing of importance to the body of logical researches, and the permanent subject of discussion, the nature of universals, did not, through any of its solutions, affect the treatment of logical doctrines. The introduction of the body of the Aristotelian writings was contemporaneous with the introduction of the Arab writings and commentaries into western Europe, and there grew up therewith a more developed treatment of what may be called the psychological element of logic. The logic of the later scholastics is characterised by two points of interest, historically unconnected, but having a natural affinity—the one, the introduction of an immense mass of subtle distinctions, mainly verbal, making up the body of the *Parva Logicalia;* the other, the influence of the

nominalist conception of thought.[1] The peculiarity of the nominalist view is the severance of immediate apprehension from discursive thought, the assignment of all matter of knowledge to the one, and of all form to the other. But form, under this conception of discursive thought, can be found only in the generalising function of signs or names; accordingly the fundamental processes of logical thought are regarded as so many modes of application of names. The later nominalist logicians were thus naturally led to the expenditure of immense subtlety and diligence on the thorny problems of the *Parva Logicalia*, while at the same time the peculiar inner difficulty of the theory became apparent as its consequences were worked out.

(5) *The Reaction against Aristotelianism and the Humanist Modification of Logic.*—Little of positive value for logical theory is offered by the numerous works representing this stage of historical development. Valla, Agricola, and Vives, with much good criticism in general spirit and detail, present a rhetorico-grammatical logic that resembles most closely Cicero's eclectic reproduction of Stoicism. Ramus, the only logician of the period with historic renown, contributes really nothing to the history of logic, his innovations consisting mainly in the omission of the most valuable portions of the genuine Aristotelic logic, the insertion of practical and interesting examples, and finally rearrangement or redistribution of the heads under which logical doctrine was expounded. The Ramist school, most numerous and flourishing, produced no logical work of the first importance.[2]

[1] The first of these is no doubt, as Prantl has laboured to prove, Byzantine in origin, but it still remains doubtful whence the Eastern logicians draw. The most probable source is the Stoic writings.

[2] See note C, p. 168.

The net result of this whole period was the severance of a certain body of doctrine, formal in character (the theory of second intentions), from theory of knowledge generally, and from all the concrete sciences. The boundaries and even the functions of this doctrine remained unfixed, for difference regarding fundamental points of extra-logical theory led to difference in mode of treatment, as well as to difference in conceptions of the end and value of logic.

IV

LOGIC OF BACON AND DESCARTES

24. Modern reform of logic, by which may be understood the attempt to place logical theory in a more close and living relation to actual scientific method, begins with Bacon and Descartes. To both the scholastic logic presented itself as the essence of a thoroughly false and futile method of knowledge. Neither had the acquaintance with the genuine Aristotelian system requisite in order to distinguish the elements of permanent value from the worthless accretions under which these had been buried, and, as a natural consequence, the views of both have a far closer resemblance to the Aristotelian doctrine than might be imagined from the attitude of opposition common to them. Both thinkers were animated by the spirit of reformation in science, and both emphasise the practical end of all speculation. For both, therefore, logic, which to neither is of high value, appeared to be a species of practical science, a generalised statement of the mode in which intellect acquires new knowledge, in which the mind proceeds from known to unknown.[1] But such a conception of logic is, if the expression be permitted, formal: that is to say, the actual province of logic is not determined thereby, but awaits

[1] Comp. *De Aug. Sc.*, bk. v. chap. 1, 2; *Princip. Phil.*, pref.

determination from the further idea of the nature of knowledge and the ultimate constitution of that which is to be known. When this point is reached, a radical divergence presents itself between the views of Descartes and Bacon, consequent on which appears a radically divergent statement of the main processes and methods of logical theory.

To Descartes the ideal of cognition is the mathematical, that in which from assured and distinct data we proceed by strict sequence of proof to determine accurately and completely the nature of complex phenomena. Such an ideal, extended so as to embrace knowledge as a whole, dominates the whole of the Cartesian speculation, and, as in the case of the Socratic doctrine of knowledge, is the ground of the Cartesian doubt. Perfect certainty, *i.e.*, clearness and distinctness of principles, logical consecutiveness of deduction from them, and exhaustive enumeration of details—such are the characteristics of completed knowledge. There follow naturally therefrom the main processes of knowledge: *intuition*, by which the simple data and axioms are apprehended; *induction*, or exhaustive enumeration of the elementary factors of any phenomenon; *deduction*, or determination of the complex as the necessary result of the combination of simple factors. To the processes of induction and deduction, when viewed more generally, the titles analysis and synthesis may be given.[1] On other portions of logical theory Descartes does not enter, and the text-books of the Cartesian school, even the celebrated Port Royal logic, do little more than expound with some freshness such of the older material as seemed capable of harmonising with the new conception.

[1] See *Regulæ ad directionem ingenii*, Nos. 2, 3, and especially 7. The celebrated rules of speculation (*De Methodo*) are only a more popular statement of the same processes.

Two things only require note in respect to the Cartesian logic, apart from its freshness and completeness : the one is the obscurity which hangs over the nature of intuition ; the other is the step in advance of the scholastic logic effected in the assimilation of deduction to synthesis. As regards the first, the criteria laid down by Descartes—viz., clearness and distinctness—are unsatisfactory and ambiguous. It is evident that he implied under these clear and distinct recognition of *necessity* in the data or principles, but the nature of this necessity is never made clear.[1] As regards the second, it was of importance to signalise, as against the scholastic view, that the universal in thought or reasoning was not only of the nature of the class notion, that genera and species were not the ultimate universals, but were themselves secondary products, formed by reasoning, and based upon essential connection of facts. In this Descartes was but returning to the genuine Aristotelian doctrine, but his view has all the advantage derived from a truer and more scientific conception of what these connections in nature really are.[2]

[1] His ultimate standard is, no doubt, necessity for a thinking subject. Whatever is so connected with the existence of the thinking being that without it this existence is incomprehensible, is necessary. But to apply this ideal to any proposition save the first, the *Cogito ergo sum*, is for Descartes the fundamental difficulty of his philosophy.

[2] It is remarkable, however, that neither in Aristotle nor in Descartes do we get many indications of any other kind of essential connection than that presented in the relations of geometrical or mathematical quantity. To both the type of exact reasoning is the mathematical. The difference between the two philosophers is but one example of what was previously remarked : that precise determination of the significance of processes of thought is dependent largely, if not mainly, on general advance in scientific knowledge. Descartes' conception of nature and of natural processes was in advance of the Aristotelian, and his conception of the method of thought by which knowledge is obtained is by so much clearer and profounder.

25. What is peculiar in the logic of Bacon springs likewise from the peculiarities of the underlying conception of nature. The inductive method, expounded in the *Novum Organum*, is, however, only part of the Baconian logic, and, since it is commonly regarded as being the whole, a brief statement of what Bacon included under logic may here be given.

Viewing logic as the doctrine which deals with the use and object of the intellectual faculties, Bacon divides it (in this approximating somewhat to the extended division of the Stoic logicians) into (1) the art of inquiry or invention, (2) the art of examination or judgment, (3) the art of memory, and (4) the art of elocution or tradition. The third and fourth divisions are unimportant; the first and second might be called respectively the theory of the acquisition of knowledge and the theory of evidence or proof. The art of inquiry is subdivided into the art of the discovery of arts and the art of the discovery of arguments. The second of these Bacon regards as identical with the *Topics* of the Greek and Roman dialectic, and therefore as of comparatively slight value. Of the first there are two main branches: (A) *Experientia Literata* and (B) *Interpretatio Naturæ*. The art of judgment has two sub divisions: the examination of methods of reasoning — induction and syllogism — which resembles the older analytic; and the examination of errors of reasoning— whether these be sophistical, *i.e.*, the logical fallacies of the older doctrine, or errors of interpretation to be removed by careful criticism of scientific terms, or arising from erroneous tendencies of the mind (the doctrine of *Idola*)—which resembles the older treatment of *Elenchi*.

The peculiarity of the Baconian logic, then, must be sought in the processes included under the art of discovering

arts or knowledge. Among these the syllogism is not included. It is a process with no practical utility; it involves premisses of which the truth is simply assumed, and consequently its conclusions can have no validity beyond that of the premisses; it affects to determine the particular from the general, but in fact nature is much more subtle than intellect, and our generalisations, which are but partial abstractions, are quite inadequate to afford exhaustive knowledge of the particular; it throws no light upon the essential part of cognition as a process in formation, viz., the method by which we are to obtain accurate notions of things, and judgments based on these notions. Moreover, the deductive or syllogistic procedure favours and encourages the tendency to rash generalisation, to the formulation of a universal axiom from few particulars, and to the uncritical acceptance of experience. If syllogism exist at all, there must be a prior process, that of generalising by rigid and accurate methods from experience itself. Syllogism is not entirely worthless. It is of particular service in some branches of science (*e.g.*, the mathematical), and generally may be employed so soon as the principles of a science are well established; but it is a subordinate and secondary method.

The art of discovery, then, is the method of generalising from experience. What this method shall be depends entirely on the thinker's conception of experience. Now Bacon's conception is perfectly definite. Observation presents to us complex natures which are the results of simpler, more general forms or causes. From the complex phenomena these forms are to be sifted out by a methodical process of analysis and experiment. A general proposition is one stating the connection between complex natures and their simple forms or causes; it is, therefore, the result of a

graduated process. No doubt there may be generalisations based only on an ingenious comparison of the complex phenomena as they are presented to us; such a process Bacon calls *Experientia Literata*, and the maxims recommended for it much resemble the ordinary methods of experiment; but truly scientific knowledge is only to be obtained by the complete inductive method.

The characteristics of this inductive method follow at once from the nature of the object in view. The form which is sought can be detected only by examination of cases in which the given complex effect is present, in which it is absent, and in which it appears in different degrees or amounts. By a critical comparison of these cases we may be able to detect, and, were the enumeration exhaustive, we must infallibly detect, by process of exclusion or elimination, a phenomenon constantly present when the effect is present, absent whenever the effect is absent, and varying in degree with the effect. Such a phenomenon would be the *form* in question — the cause of the given fact or attribute. Exhaustive enumeration is, of course, an ideal, and therefore the method of exclusion can never be perfectly carried out; but all additional aids have significance only as supplying in part the place of exhaustive enumeration. We may, on the basis of a wide examination, frame a first generalisation (*first vintage* as Bacon metaphorically calls it), and proceed to test its correctness by carrying out the critical comparison with it in view. Or we may, under the guidance of our leading principle, take advantage of certain typical cases presented by nature, or force cases by experiment, in such a way as to supersede the enumeration. There are *prerogative* instances, critical phenomena, helpful in discovery of the cause of a phenomenon. Of other *adminicula*, or aids to induction, only the

titles are given by Bacon, and it would be hazardous to conjecture as to their significance.[1]

The Baconian logic, then, or at least what is peculiar to it, is thoroughly conditioned by the peculiarities of the Baconian metaphysic or conception of nature and natural processes. As to the novelty of the logic, this to us does not appear to lie in the mere fact that stress is laid upon induction, nor do we think it correct to assign to Bacon the introduction of the theory of induction as an integral portion of logic. But it consists in the new view taken of what constitutes the universal in thought, a view which may be inadequate,[2] but which colours and affects every process of

[1] *Nov. Org.*, ii. 21. In addition to prerogative instances there are mentioned—supports of induction; rectification of induction; variation of the investigation according to the nature of the subject; prerogative natures; limits of investigation; application to practice; preparations for investigation; ascending and descending scale of axioms.

[2] A word may be permitted on the objection so frequently raised against Bacon's method of induction, that its mechanical character not only fails to correspond to the actual process of discovery, but demands a wholly impossible enumeration of instances. It is not a little remarkable that this objection should be raised by any logician who accepts the empirical theory of knowledge, who holds therefore that, except in the case of facts immediately apprehended, we have only probability as our guide. For this is the very foundation of Bacon's doctrine. The exhaustive enumeration (*i.e.*, the immediate apprehension of all facts) is an ideal, but whatever falls short thereof, is not exact knowledge, and must be dealt with by other methods. The tables of presence, absence, and degree are no more the whole of the Baconian theory of induction than are the four experimental methods the whole of Mill's doctrine of inductive proof, though a similar misconception is not infrequent in respect to the latter also. Bacon is perfectly conscious of this defect in his method: he advocates the use of hypothesis, though it is hardly surprising that, with certain current hypotheses before him, he does scanty justice to this potent instrument of research; and almost the whole exposition of the inductive method is concerned with one of

thought, and therefore every portion of logical theory. It is but a consequence of Bacon's narrow view of the essence of syllogism that he should set induction in opposition to deduction, and regard syllogism as of service only for communication of knowledge. His inductive methods are throughout syllogistic in this respect, that they like all processes of thought involve the combination of universal and particular. Experience is interpreted, that is to say, viewed under the light of a general idea or notion.

the processes supplementary to and necessitated by the impossibility of realising exhaustive enumeration. The names of the other supplementary processes contemplated by Bacon at least suggest many of the methods which have been brought forward in recent logics as antithetic to the mechanical induction of the *Novum Organum*.

V

LOGIC ON THE BASIS OF PSYCHOLOGICAL EMPIRICISM: LOCKE, HUME, MILL, CONDILLAC

26. The universal element in thought which is recognised by Bacon as present received from him no special treatment. His theory of the nature of knowledge offered no explanation of the origin, significance, and validity of the notions involved in inductive procedure. The *Essay concerning Human Understanding*, which carries out in the domain of inner experience the practical tendency of the Baconian method, supplied from the point of view of individualism the metaphysical theory common to both, a certain psychological theory of the universal element in knowledge, and thereby afforded a new foundation for logical doctrine. The *Essay* contains, in an unsystematic fashion, much that bears directly on logic (*e.g.*, the whole discussion on names, the classification of the signification of judgments, the criticism of syllogistic argument); but of more importance than these detached and direct portions is the general principle which underlies the whole view of human knowledge. This principle is briefly that of psychological genesis. All the complex facts of knowledge are regarded as mechanical compounds due to the coherence of simple data, the facts of inner and outer sense. It is

true that Locke's effort to carry out the view is full of difficulty and even of contradiction; it is true also that the specifically logical processes of judging appear, without any warrant, as reflective acts exercised upon the materials furnished by sense, and that generally there is no attempt made to push the ultimate explanation further than to the very complex fact of an individual mind endowed with a multiplicity of powers, by means of which it brings into the isolated impressions of experience the order and logical coherence which are the very characteristics of knowledge. Nevertheless, the method of Locke is that which underlies and determines all the logical work of one very important school of logicians.

It is not needful to enter into details of Locke's own contributions to the foundation of logic. But it may be pointed out that from his position there were two possible lines of development. In his view the primitive impressions, the facts of inner and outer sense, were in themselves primitive facts of cognition; they were cognitions (it is the very essence of Locke's method to identify a simple impression of sense with the knowledge of a simple sense fact). The processes of abstraction, comparison, *i.e.*, judging and reasoning, were exercised upon their data, and these products were, in consequence, of a secondary and, so to speak, artificial character. It was natural that a thinker who identified impression of sense with knowledge of a sense fact should maintain that the secondary formations of thought (general ideas, general propositions, syllogism) were not indispensable for cognition; that we could and did reason from particulars to particulars. At the same time Locke admitted the secondary processes as having actual existence, and in one important case (that of the judgment of coexistence, with which may be taken

the idea of substance and of real relation) seemed to allow that in judgment something was added to the primitive data. It was possible, then, for development from Locke's position to proceed either by offering an explanation of the added elements, which should be in stricter harmony with the fundamental doctrine of psychological genesis, or by throwing them entirely out of account and concentrating attention on the primitive data as the only materials of cognition. The first is the line taken by Hume, which finds its logical completion in Mill; the second is the line taken by Condillac.

Hume has an easy task so long as he merely subjects Locke's position to negative criticism; for the added elements, the ideas of substance, relation, cause, &c., are clearly inept and defenceless when the facts to be linked by them are already contemplated as so many completed, isolated cognitions. But where connectedness of cognition is in question, and where some explanation is demanded of the relations which seem to supply the universal rule in thinking, Hume's task is not so simple, and his final answer that these relations are psychological growths or products of association is neither satisfactory in itself nor quite in keeping with other portions of his doctrine. In Hume, however, we find the first thorough-going attempt to construct a theory of knowledge on the basis of psychological empiricism or individualism, and the first contributions to a doctrine of inductive proof as portion of this more comprehensive theory.[1] Briefly, so far as logic is

[1] It seems hardly necessary to call attention to the points of similarity between Hume's expressions on logical questions and the allied opinions of Mill. But there may be specially indicated for comparison the classification of kinds of knowledge implied by both (intuition or immediate apprehension, proof, and probable reasoning), and Hume's remarkable, thoug brief, statement of the rules for

concerned, Hume offers as explanation of the universal in thought association of ideas, but does not treat of logic specially or in detail.

The complete statement of the theory of knowledge from the psychological point of view is that contained in Mill's *System of Logic*. This well-known work, which has contributed much of value to general logical discussions,[1] is a complete exposition of all the processes concerned in the formation of knowledge, from the individualist standpoint. It is therefore to a large extent polemical, or, at least, animated by the spirit of defence against attacks on the fundamental position. The purely expository portion, however, contains the logical theory of psychological empiricism in a form which may fairly be regarded as final.

The aim of the work is the exposition of the theory of knowledge. Now knowledge, the term being taken in a wide sense, is characterised by one quality mainly, viz., evidentiary force. For every item entering into the sum of our beliefs at any moment, immediate perception being discounted, there may be reasons advanced, adequate or inadequate. The exposition of the relations between beliefs and their evidence or ground is logic; and logic is thus in one sense formal, inasmuch as the relations of evidence and belief are general, not dependent on the special nature of the facts believed, and in another sense

reasoning with regard to causation. These rules contain in essence the inductive methods. The matter, however, is only of historic interest, for the originality of Mill's treatment of the empirical logic is in no way affected by similarity between his ultimate philosophical views and those of Hume.

[1] The treatment of logical problems, such as the significance of the proposition, the theories of division and definition, is always instructive. But upon matters of detail the present discussion does not profess to enter.

real, in that knowledge is conceivable only in strictest relation to the things known.

Now, the exposition of the general nature of grounds of belief, while it implies a statement of the modes in which data and conclusions are expressed, and a reference to the nature of that which is expressed,[1] is in fact identical with a theory of the universal element in thought or cognition, and this theory is the essential portion of Mill's logic. It being assumed that the facts with which knowledge is concerned are minds, bodies, states of consciousness, and the relations (coexistence, sequence, similarity) among these states, and that propositions express, therefore, existence, coexistence, sequence, or resemblance, on what is based any inference going beyond a present perception? The propositions which make up cognition, strictly so called, are not mere expressions of momentary states; they are expressions of belief regarding the more or less constant relations of facts. They are, in fact, conclusions. The theory of proposition and of reasoning is one. On what, then, do such conclusions rest?[2]

The warrant for any conclusion based upon experience, and referring to experience itself, can be found only in experience or in some principle furnished by experience. It may be shown that evidence for a conclusion is adequate, if we can compare this evidence with the kind of evidence on which a wider conclusion, frequently or constantly verified, rests. This comparison of particular evidence

[1] The theories of naming and of propositions.

[2] Any references, in the discussion of so fundamental a problem, to empirical constancies, to the universality of extent or fact, as opposed to universality of intent or essence, are beside the mark. Nor is it advisable, in considering Mill's solution, to follow the order of exposition in the *System*, which proceeds by assuming a form of the solution which is to be afterwards justified.

with mere general evidence is the preliminary answer furnished by Mill. But what is the general evidence referred to, and what is the principle founded on it? The general evidence is the repeated experience of constancy of connection among groups of phenomena, and the principle founded on it is that of the existence of uniformity or rather of uniformities in nature. The evidence and the principle are purely psychological in character; that is to say, repeated experience, beginning with familiar cases and extending itself as time goes on, produces, by the natural laws of association, an assured belief that phenomena as a whole, or at least in the main, are connected together in constant, uniform, invariable modes. Such a belief, once established, serves as an ultimate criterion of proof, and as an index for research. We proceed in our investigations in the light of this principle, and the tests by which we estimate the validity of evidence for any particular inference as to uniformity are generalised statements deducible from it. So soon as our evidence is of such a character that, in the case before us, either the inference of uniformity is warranted or the general principle must be held not to apply to this particular case, we have proof as cogent as experience can afford.[1]

The universal in knowledge, then, is this naturally formed assumption regarding the course of nature. The logic of knowledge is the exposition of the modes in which evidence is obtained, of the tests by which its validity is estimated, and of the forms in which evidence and conclusion are connected.

The characteristic features of the subordinate processes

[1] It would have added to the clearness of Mill's exposition of induction (*System of Logic*, book iii.) had the word *cause* been entirely omitted. Nothing but confusion arises from its use.

of proof are at once deducible from this fundamental view. For if the simplest form of inference be, psychologically, the transition effected by association from one particular case to another resembling it, and if the essence of proof consist in comparison of the evidence for any one conclusion with the type of evidence for the general assumption regarding nature (or at least a wider portion of nature), it is evident that syllogism, in the ordinary acceptation of the term (in which it implies a concrete general proposition, a particular subsumed thereunder, and a conclusion), is neither a primitive form of inference nor a valid mode of proof. Doubtless we do in reasoning employ general propositions in order to express the determination of some particulars belonging to the same class; but the general proposition is itself a conclusion, resting on evidence of the kind above described, and the essence of syllogistic reasoning is not the subsumption of a particular under a general in which it is included, but the expression of belief that the evidence for the general proposition is adequate to cover all the particular cases, including those which have not been taken into account in formulating it. The major premiss of a syllogism is the record of a previous induction; and the syllogistic process, bringing forward a new case, is a valuable method for testing the adequacy of the previous generalisation. As to generalisation itself, the basis is evidently to be sought in experience, apprehended by observation and experiment. Did experience present to us isolated phenomena, *i.e.*, phenomena so arranged that enumeration of the elementary constituents, whether antecedents or consequents, were possible, then our inductive procedure must be regulated by those canons or axioms which express the kind of evidence already referred to as establishing uniformity.

These canons or axioms, however, are, like the Baconian method of exclusion, tests for an ideally perfect experience, and they, therefore, only lie in the background of actual scientific procedure, which has to employ other processes both of inference and of proof. For, if we can in no way obtain more than a knowledge of the coexistence of facts, we are unable to bring our evidence into conformity with the inductive canons, save in the ideal instance in which absolutely exhaustive experience both of positive and negative cases is possible. Inferences as to law or uniformity of coexistence must here be based on numerical calculation of probability, and the conclusions present themselves in the peculiar numerical form appropriate to propositions of probability. Further, if the phenomena under investigation be complex, so that the canons of neither observation nor experiment are immediately applicable, the process of investigation must of necessity be the combined method of analysis and synthesis: analysis, aided by hypothetical conjecture, formulating such general laws of elementary factors as are known or presumed to exist in the case in question; synthesis, combining these laws and calculating with greater or less numerical exactness, according to the nature of the matter, the probable combined effect — the whole tested by critical comparison of the calculated result with the actual phenomena. Here, as one can see, syllogistic procedure appears in its true scientific aspect as the form of thought by which we pass from the simple to the more complex, from the elementary essence or cause to the complex accident or effect. The elementary causes, no doubt, have no more cogent evidence than that which can be afforded by experience viewed in the light of our psychological assumption of uniformities; nevertheless the whole procedure of scientific investigation

is recognised as being essentially of the type sketched in somewhat imperfect outline by Aristotle.

So far, then, as the logic of Mill is concerned, and apart from the undeniable richness and completeness of knowledge with which the various processes are treated, we note but one fundamentally new feature, namely, the explanation offered of the universal element through which alone perceptions are raised into cognitions, through which alone reasoned knowledge is possible. It is the only explanation possible on the basis of psychological individualism; its value, and therefore the value of the systematic deductions from it, must depend on the accuracy and coherence of the psychological or metaphysical theory on which it is founded.

27. It was possible, however, to proceed by another route from the position taken up by Locke. If it be held that the elementary impressions, mechanically regarded as somehow arising in mind, are in themselves cognitions, then it is possible to view them as containing in themselve all possible cognition. In other words, we may confusedly identify the proposition that knowledge does not extend beyond the field of experience with the very different proposition that the only items of knowledge are the isolated impressions which appear to make up experience. If this identification be accepted (and the conception involved is precisely that underlying all consistent nominalism from Antisthenes downwards), then the only processes requiring to be taken into account are those whereby clearness and distinctness are introduced into our (possibly) vague perceptions. For these processes analysis is an adequate title. All knowledge, *i.e.*, whatever is characterised by clearness, definiteness, consequence, is the analysis of what is given

in isolated perceptions. Each perception is itself and is only itself; no judgment is possible save that of identity. In other words, if there be judgment at all, it can consist only in the assertion that the unanalysed perception is identical with that into which it is analysed, and as each perception and each analytic portion of a perception may be signified by an arbitrary sign (name or other hieroglyphic), judgment is essentially an affair of naming, a declaration that different names are identical or belong to the same perception. Reasoning is simply the transition from one identity to another—a more developed result of analysis. Scientific or real knowledge is an accurately framed system of signs, *i.e.*, a collocation of signs which expresses precisely the results of the analysis of complex perceptions. Logic, under this doctrine of knowledge, is merely a statement of the various modes in which analysis is carried out, of the ways in which names are applied, and of the forms in which names are combined. Such is the theory of logic presented by Condillac.[1]

[1] See *Langue de Calcul; Art de Penser;* and *Logique. Cf.* Laromiguière, *Leçons de Philos.*, i. pp. 5-43; and Robert, *Les théories logiques de Condillac*, 1869.

VI

LOGIC ON THE BASIS OF METAPHYSICAL PSYCHOLOGY: LEIBNIZ AND HERBART

28. One development from the psychology of Locke has thus appeared as an extreme formalism, which if carried out consistently must needs assume the aspect of a numerical or mechanical system of computation.[1] It is remarkable that a very similar result was reached by Leibniz, a thinker who proceeded from a quite opposed psychological conception. The idea of logic, or rather the hints towards a new view of the essence of logical processes, to be found in various tracts by Leibniz, must be taken in close relation to the metaphysical psychology which lay at the root of all that thinker's speculations. We shall probably be able to see that the similarity is due to the presence in both theories of a certain abstract principle, intimately though not necessarily connected with the respective psychologies.

It is not needful to enter into an elaborate survey of Leibniz's metaphysical psychology: the main features which have reference to logical processes alone require to be taken into account.

[1] Such as is hinted at by Hobbes, and as is carried out in the various works of Jevons.

Ultimate reality or substance strictly so called is to be found only in the qualitatively distinct, active, indivisible monad, incessantly changing or developing. Such incessant change, a condition in which there is both difference and identity, is only conceivable if the essence of the monad be regarded as representative activity, as psychical in character. The life of the monad is thus an incessant self-development, in accordance with the laws of its own nature and of the universe. The existence of the monads is dependent on the absolute thought of God, from whom they have sprung, and whose objective thought is the universe. The system of representations which develops in each monad is in one sense subjective (each monad is a universe to itself), in another sense objective in that the development of all must proceed in the strictest harmony with the objective thought of God. Finite monads develop in varied degrees; all of them have psychical life of a kind, but only in the higher monads is there reflective consciousness (apperception) resting upon and implying a certain clearness and distinctness of perceptions. From the very nature of the finite monads, their apperception is subjected to two fundamental laws: identity or non-contradiction and sufficient reason. For as they are finite, each representation must be treated by them as requiring a ground or reason for its reality; as they are conscious of their own identity, no representation can be for them possible which contains contradictory marks. To introduce system into the conscious life of the monad, *i.e.*, to produce science, it is needful to treat every representation as a conditional fact to be referred backwards to distinct, identical grounds or reasons. All truths are ultimately identical, but this identity is not always evident to the finite monads. Only God possesses clear and distinct

knowledge of all propositions: only in Him are all truths identical. To finite intelligences some truths are manifest; others (truths of fact, empirical cognitions) are obscure, and the attempt to trace them back to ultimate principles may be one which cannot be completely realised. The *prima possibilia* may not be attainable for all actual phenomena.

In place of the single perception which in Condillac's logic is the element to be analysed, there appears in Leibniz's view the single consciousness of the monad; in both cases, however, knowledge is assumed to exist there implicitly and to stand in need only of evolution. The methods by which this evolution is to proceed form for Leibniz the substance of a new and all-comprehensive science, "Scientia Generalis," of which the older logic is but a part.

The characteristics of Scientia Generalis are at once deducible from the two general principles which in Leibniz's view dominate all our thinking—the law of sufficient reason and the law of non-contradiction. It must contain a complete account of the modes in which from data conclusions are drawn, and in which from given facts data are inferred; and since the only logical relations are those of identity and non-contradiction, the forms of inference from or to data must be the general modes of combination of simple elementary facts which are possible under the law of non-contradiction. The statement of the data of any logical problem, and the description of the processes involved in combining them or in arriving at them, are much assisted by, if not dependent on, the employment of a general *characteristic* or symbolic art.

The fundamental divisions then of Scientia Generalis, so far at least as its groundwork are concerned (for Leibniz sometimes includes under the one head all possible applica-

tions of the theory), are (1) the synthetical or combinatorial art, the theory of the processes by which from given facts complex results may be obtained (of these processes, which make up general *mathesis*, syllogistic and mathematical demonstration are special varieties); (2) the analytic or regressive art, which starting from a complex fact endeavours to attain knowledge of the data from whose combination it arose.[1]

Of the nature of the second portion only a few brief indications are contained in the logical tracts and in detached utterances in the larger works of Leibniz. When complex combinations are presented, or, in the most general form, when the investigation has to start from experience, from truths of fact, the work of analysis is endless; the regress to conditions is practically infinite. Determination of the necessary data cannot in such a case possess more than probable value, but the probabilities may be estimated according to the rules laid down in the progressive or synthetic art.[2] The logic of probability is thus recognised as an integral portion of the logical system.

Of the first art, the logical calculus in particular, a somewhat clearer and fuller outline is given.[3] The logical calculus implies (1) the statement of data in their simplest form, (2) the assignment of the general laws under which combination of these data is possible, (3) the complete

[1] Leibniz sometimes includes these two under the head of "Ars Inveniendi," and places alongside of this, as first part of Scientia Generalis, "Ars Judicandi," a division resembling that appearing in Bacon; but the "Ars Judicandi" may be thrown out of account.

[2] *Op. Ph.* (ed. Erdmann), pp. 397, 398; *cf.* generally pp. 84, 93, 343.

[3] See specially *Op. Ph.*, pp. 92-114; also the tract "De Arte Combinatoria," *Op. Ph.*, pp. 6-45.

exposition of the forms of combination, (4) the employment of a definite set of symbols, both of data and of modes of combination, subject to symbolic laws arising from the laws under which combination is possible. In the *Fundamenta Calculi Ratiocinatoris* and the *Non inelegans Specimen Demonstrandi*, something is effected towards filling up the first, second, and fourth of these rubrics, but in no case is the treatment exhaustive. The simple data, called characters or formulæ, are symbolised by letters, relations of data by a somewhat complicated and varying system of algebraic signs; for the calculus, or set of operations exercised upon relations given so as to produce new formulæ, no comprehensive system of symbols is adopted. Formulæ, relations, and operations take the place of notions, judgments, and syllogism. The general laws of combination of data are stated without much precision. Leibniz recognises the law of substitution, notes also what have been called the laws of reduplication and commutativeness, but, in actual realisation of his method, employs indifferently the relation of containing and contained or the relation of identical substitution (æquipollence). No attempt is made to develop a complete scheme of possible modes of combination.[1]

At the root of Leibniz's universal calculus, as of Condillac's method of analysis, and generally of nominalist logic, there lies a peculiar acceptation of the abstract law of identity. That a thing is what it is—that knowledge of

[1] It is interesting to note that Leibniz signalises the distinction between the logical and mathematical senses of a whole, and between the distributive and the collective meaning of quantity; that he emphasises the function of the particular judgment as the negation of its opposed universal; and that he approximates to some modern modes of formulating the judgment (*a* is *b*, *e.g.*, he would express as $a=ab$, or *ab* is; no *a* is *b*, as *ab* is not).

a thing is a single, indivisible, mechanical fact, susceptible only of explication or of expanded statement—this is the principle dominating logical theories which in other respects may differ widely. Insistance upon this aspect of knowledge or of the object known is the ground for assigning to thought a function purely analytic, which is the very keynote of nominalism. It is not hard to see, however, that so to view the law of identity is to abstract from all the conditions of actual thinking and knowing, and to throw into the assumed simple fact all the complexity which is afterwards to be discovered in it by analysis. The knowledge of a thing is not to be explained in this abstract or mechanical fashion. Truth does not consist in the empty recognition that a is a, and in the repetition of this unimportant fact, but in the knowledge of the nature of a, a knowledge which essentially consists in relating a to its intellectual conditions, in assigning to it a place in the intelligible world. The identity of the thing with itself is a mere aspect of the complex process whereby the thing is cognised. It hardly requires to be pointed out that the minor forms of the same fundamental view, the various attempts to express the essence of a judgment as the assertion of identity, are open to the same objection. They take an abstract view of the judgment, and regard as the essential fact that which is but an accessory or adjunct or consequence. Difference, to put it in the briefest fashion, is no less essential to a judgment than identity.[1]

[1] Much of the confusion which reigns supreme in many modern works on logic is doubtless attributable to a confusion between the nature of the judgment and the result of a judgment. The result of a judgment is always an increased richness of the subject notion; the subject unqualified and the subject qualified by the predicate are doubtless identical; but it would be absurd to say, therefore, that the function of the judgment is the assertion of this identity.

29. The view of logic put forward by Herbart, from a metaphysico-psychological basis resembling that of Leibniz, agrees in so many respects with that of Leibniz, although containing no reference to the idea of a logical calculus, that it may be placed under the same head. Logic, according to Herbart, is a purely formal doctrine; it has to do only with the modes by which clearness, distinctness, and system are introduced among our ideas. Logical forms, then, the notion, judgment, and syllogism, are not to be regarded as having any metaphysical reference; they are not even to be explained psychologically; they stand on their own footing as explanatory processes exercised about the representations which under their own natural laws fill up consciousness, coming and going within the sphere of apperception.[1] According to this view the whole province of knowledge is excluded from logic, and it is assumed that knowledge is somehow given, mechanically, without the co-operation of processes, if not identical with yet strongly resembling, those recognised as logical. Herbart does not succeed in vindicating an independent place for a purely formal logic.

[1] There is a certain inconsistency in Herbart's view of logic, inasmuch as logic is not the only discipline which has to do with clearing up our ideas. Metaphysics has specially to clear up fundamental contradictions in notions furnished by experience. Logic then must be in some way restricted so as to fall beyond the sphere of metaphysics. Probably the mark of restriction would be found in the given character of the ideas; logic considering them simply as they are and dealing with the relations in which they as given may stand to one another, while metaphysics has to examine the significance of certain notions for our thinking and to clear them up in this particular reference.

VII

THE KANTIAN LOGIC

30. The critical method, which has so influenced general philosophy that all later speculation refers more or less directly to it, has at the same time profoundly modified all later conceptions of the sphere and method of logic. From the Kantian philosophy there spring directly the three most important modern doctrines of logical theory: that which, with many variations in detail, regards logic as a purely formal science, the science of the laws of thought or of the laws under which thought as such operates, and of the forms into which thought as such develops; that which, likewise with many variations, unites logical doctrines with a more general theory of knowledge; and finally, that which identifies both logic in the narrower sense and theory of knowledge with an all-comprehensive metaphysic. Indeed the grounds of distinction between the several doctrines thus brought into connection, and the significance of the terms by which they are expressed, are intelligible only when taken in reference to the Kantian system. The peculiar sense attached to the term thought (from which follows naturally the formal view of logic), the opposition between thought and knowledge (upon which rests the distinction between logic and theory of knowledge), the

ultimate idea of the relation between thought, knowledge, and reality (upon which might be founded a distinction between logic, theory of knowledge, and metaphysics), are all Kantian in origin.

It is matter of history that the critical system was developed mainly from the basis of the Leibnizian logical and metaphysical theories, and it is likewise matter of history that Kant, even in the speculative work which was to so large an extent antagonistic to these theories, remained under the influence of some of their cardinal positions. In particular the view of logical thought as purely discursive, analytic in character, a view never by Kant harmonised with his general system, is a relic, most significant for the development of his logic, from the Wolffian reproduction of Leibniz's philosophy. This historic basis is not to be lost sight of in attempting to acquire a clear idea of the special place and function assigned by Kant to logical theory.

But a brief reference to the general result of the critical philosophy will suffice to introduce the more special treatment of the Kantian logic. Knowledge, or real cognition, which is analysed in the *Kritik* in reference to its origin and validity, appears, when subjectively regarded, as a compound of intuition and thought, of sense and understanding. The isolated data of sense experience do not in themselves form part of cognition, but are only cognised when related to the unity of the conscious subject, when the subject, as it may be put, has consciousness of them. This reflex act, resembling in some respects Leibniz's apperception, or process of uniting in consciousness, is an act *sui generis*, not to be mechanically conceived or explained. Only through its means do representations become cognitions. The forms in which the synthetic act of understanding is carried out

are, as opposed to the intuitive data on which they are exercised, discursive or logical in character. Essentially they are judgments: all acts of understanding are judgments, and, as judgments, they imply a general element with which the particular of sense is combined, and in the light of which the particular becomes intelligible.

In ultimate analysis it appears that no particular, whatever be its empirical character, can become an intelligible fact, save when determined through some specific act of understanding, through combination with some specific notion or general element. Combination of particular and general is thus the very essence of understanding, the mark of knowledge as such. In every item of cognition the same elements may be discerned as necessarily present. The consideration of the ultimate modes of intellectualisation, of the series of acts by which understanding subsumes the particular, draws the particular into the unity of cognition, may be called in a large sense logic. If the consideration be specially directed to the mode in which, by means of this combination, knowledge arises, and therefore include discussion of the wide problem regarding the relation between understanding and objectivity in general (the matter of knowledge taken generally), the special title transcendental logic may be used. But if, concentrating attention solely on the kind of operation implied in understanding, we endeavour to lay out fully the modes in which understanding proceeds in the construction of knowledge, making abstraction of all inquiries regarding the origin, worth, significance of knowledge itself, the consideration is of a more general character, and may receive the title of general logic.[1]

[1] It does not seem necessary to advert more in detail to the divisions and subdivisions of logic drawn out in the *Kritik*, pp. 86-93 (Hartenstein's ed., 1868).

The understanding then, like everything else, works according to laws, the laws of its own nature. If we abstract from all that may characterise the matter considered, and take into account solely the laws according to which understanding must act, we may construct a purely formal doctrine, a theory which is rational both in matter and in form: for the matter consists of the laws of reason, and the form is prescribed by the very nature of reason,—a demonstrative theory, for nothing can enter therein which cannot be shown to have its ground in reason, —a completed theory, for although the matter of thought is infinite and infinitely varied, the modes in which the understanding must operate if unity of cognition is to result, are finite and capable of exhaustive statement,—and a theory developed from its own basis, standing in no need of psychology or metaphysics, but deducible from the mere idea of understanding as that which introduces unity into representations, whether given (empirical) or *a priori* (pure).

Were this the only determination of the province of logic given by Kant, the question which at once arises as to the possibility of any such independent doctrine would receive an easy solution. For it is evident that logic, as a theory of the form of thought, could consist only of a portion of the more general doctrine, by whatever title that be known, in which the nature of understanding as synthetic activity is unfolded. The distinction on which Kant lays stress between matter and form, a distinction employed by all subsequent writers of his school, is ambiguous and misleading. If by matter be meant the particular characteristics of the things thought about, in which sense we might speak of judgments of physical, chemical, grammatical matter, and so on, then to say that logic does not take this into account

is perfectly inept. If logic be a philosophic discipline at all, a theory in any way concerned with thinking, it is at once evident that it can in no way deal with the specialities of any particular science. But this distinction between matter and form is by no means identical with another, lying in the background, and too frequently confused with the first—the distinction of understanding as a faculty *per se* with its own laws, deducible from its mere notion, and understanding as the concrete real act of thinking. What Kant calls the mere idea of understanding, and what in other writers of his school appears as a definition of thought, is really nothing but a reference to what has presented itself in the wider inquiries of the *Kritik* as the complex nature of the synthetic activity of understanding. Kant himself never attempts to deduce from the notion of understanding the varied characteristics of logical forms, and his followers —*e.g.*, Hamilton — when they are consistent, start from concepts as expressing the bare notion of thought, and regard all other forms of thought as combinations of concepts.

But Kant does introduce another element into his treatment of the province of logic, one not original to him, but of the utmost importance for later developments from his point of view. He inquires what kind of relations among the elements of thought can form the matter of logical treatment, and defines these as two in number—(1) formal consequence, (2) non-contradictoriness. By formal consequence we are to understand the relation between a conclusion and its premisses, no inquiry being raised as to the truth or validity of the premisses. By non-contradictoriness we are to understand that, logically, notions, judgments, or reasonings can be subjected to treatment only in regard to the absence of explicit contradiction among the factors

entering into them. Thought, which introduces unity and system into experience, must certainly introduce formal consequence and preserve analytic truth or correctness. Formal logic, then, treats only of these formal qualities of all products of thought.[1]

The detailed treatment of logic, so far as that can be gathered from the very brief summary given in his *Logik*, shows with the utmost clearness how impossible it was for Kant to deduce the forms and relations of thought from the mere notion of understanding, even when coupled with the principles of formal consistency and consequence. Assuming that understanding is the discursive faculty, the faculty of cognising the many particulars through the one concept or notion, Kant deals first with concepts (Begriffe) as general or discursive representations. He is careful to avoid an error into which many of his followers have fallen, that of regarding Begriffe in a mechanical fashion as a specific kind of Vorstellungen, distinguished only by con-

[1] Two at least of the followers of Kant have worked out the system of logic from this point of view—the one, Twesten, in his *Logik, insbesondere die Analytik* (1825), the other, Mansel, in his *Prolegomena Logica*. Mansel recognising the distinction between the two modes of determining formal logic, adopts the second, and is therefore led, in consistency, to define logic, not as the science of he laws and forms of thought, but as the science treating of formal thought, or of the formal element in the forms of thought. In other words, he recognises that the statement of the forms of thought must be introduced into logic *ab extra*, from psychology or what not, and that logic, accepting these, has to consider the formal element (non-contradictoriness) in them. It is well to have the doctrine brought thus to its ultimate issue, for it is thence apparent that there is no independent science called logic, but simply one comprehensive precept, which may be called logical—viz., avoid contradictoriness in thought. Illustrations of the ways in which contradictoriness manifests itself may be offered, and a useful logical praxis may thus be afforded, but these do not make up a science or theory.

taining a few of the marks making up the single intuitions. He rightly notes that cognition proceeds by subsuming the particulars under the common element contained in them, and that the generality of the concept thus rests upon the relation in which it stands, as reflective ground of cognition, to the particulars. The characteristics of concepts, as possessing extent and content, are treated briefly, after the fashion familiar in the more detailed logics of his school.

It is, however, when the doctrine of judgment is reached that the difficulties of his position appear with greatest distinctness. Judgment is defined "as the representation of unity in the consciousness of distinct representations, or the representation of the relation of these, in so far as they make up a concept."[1] But the essential element in the definition — the unity of consciousness or unification of differences in a notion—is thus left so vague and undetermined that it is impossible to deduce from it any classification or any peculiarities of judgments, and possible indeed to proceed on two quite distinct lines of research. The expression, indeed, refers to that which is the fundamental fact in the critical system, the existence of conditions under which only it is possible for detached data of experience to become objects of knowledge for the single conscious subject; and, had Kant been true to the principles of his system, it would then have been necessary to base any classification and treatment of judgment on the enumeration of the functions of unity in conscious experience. In the *Kritik*[2] emphasis is laid upon the function of unity as the essence of the judgment, but it is a well-known historic fact that Kant makes no attempt to justify in its details the enumeration of such functions on which his divisions rest.

[1] *Logik*, § 17.

[2] *Analytik*, § 19.

His followers in the field of logic,[1] misconceiving the real relation of form to matter, interpreted the unity involved in the judgment as being a merely quantitative relation between given notions.[2] There is here involved a twofold error, which has exercised a most pernicious influence on the fortunes of logical theory. For, in the first place, so to view judgment is implicitly to proceed from the assumption of notions as given elements of knowledge, the relations of which are to be discovered by comparison or analysis of what is contained in them. The notion as empirically given thus becomes the fundamental fact; all other forms of thought, judgment, and syllogism are regarded as merely the mechanism by which the content of notions is evolved. Such a doctrine puts out of sight the peculiarities of the notion as the product of thought only, inevitably compels a distinction between what we may call the real processes of thinking whereby notions are formed and the elaborative processes by which notions when formed may be treated, and, by regarding notions as simplest data, leads back to the old nominalist doctrine according to which all thinking is but the compounding and separating of simple elements.[3]

[1] See specially the treatment of judgment by Esser (*Logik*, §§ 56 and 61), and Jakob (*Log. u. Met.*, §§ 189, 194, 201, 202), where the division of judgments into categorical, hypothetical, and disjunctive flows from a quite arbitrary and artificial principle.

[2] See Twesten, *Logik*, §§ 51-57, and 61; Hamilton, *Logic*, i. 230 *sq.* It may here be remarked that Hamilton's mode of translating the relative sections of Krug and Esser, his main authorities for the details of the Kantian logic, clearly shows that he did not attach any special significance to the phrase "unity of consciousness." In his view, the unity implied in the judgment A is B was the union of A and B in the notion of a given totality or whole—A being part of B in one aspect, B being part of A in another. This relation of whole and part is quite un-Kantian.

[3] It is by this course that the curious phenomenon of an algebraic

And, in the second place, there is involved in all this the underlying prejudice, which it was the very business of the critical system to destroy, the attempt to treat knowledge, and thought, which is an integral part of knowledge, in a purely mechanical fashion. The Kantian analysis for the first time in the history of philosophy brought into clear light the essential peculiarity of knowledge, the reference of all the manifold details of experience to the unity of the thinking subject. Such reference, and the modes in which it expresses itself, are not to be conceived mechanically, nor can we regard the products of thought, the notion, judgment, and reasoning, in the same fashion in which, with but partial success, we treat, in psychology, the representations or reproductions in idea of actual fact. The essence of thought, the unity in difference of objects known and subject cognising, is that which constitutes in its several modes the peculiarity of notions, judgments, and reasonings. The notion is simply the work of thought, looked at, if the expression be allowed, statically. There is no single psychical product, to be treated by the method of observation which is applied in psychology to sensations and ideas, which can be called the notion. Mental facts, which rightly or wrongly psychology deals with after its mechanical fashion, present themselves in a new aspect when they are regarded as parts, or rather as organic elements, in cognition. If we endeavour to apply the abstracting, isolating method of observation *ab extra* to them, doubtless only mechanical, abstract, and external

or symbolic logic springing from the Kantian groundwork has come about. The same result follows, indeed, from any view of thought as merely exercised *about* facts which are already in themselves completed cognitions. Whether we call these notions (with Hamilton) or πρῶτα (with Antisthenes) or elementary data (with Leibniz) or simple apprehensions (with the nominalists), the result is the same.

relations will manifest themselves as obtaining among them, and there may thus be deduced a mass of abstract formulæ expressing relations of agreement and disagreement, total or partial coincidence, confliction, intersection, or coexistence and sequence, which have abstract truth, but are in no way adequate to express the genuine nature of thought.

Kant himself proceeds, as was said, by simply assuming, as somehow given, the cardinal forms of unity in consciousness, and, distinguishing form of judgment from matter by the apparently simple difference between matters united and forms of uniting, draws out the types of judgment under the familiar rubrics of quality, quantity, relation, and modality. The same assumption of distinctions only to be given by the higher researches of transcendental logic is manifested in his treatment of reasoning, the deduction of one judgment from others. Three main types of such deduction are signalised: (1) deductions of the understanding, in which the conclusion follows simply from change in the form of the given judgment; (2) deductions of reason, in which the necessity of the deduced proposition is shown by reference to a general rule under which it falls; (3) deductions of judgment, in which the conclusion is reached by the treatment of given experience in reference to a general rule of reflection upon experience. Under the first of these fall the familiar forms of immediate inference; under the second, syllogism in its three varieties, categorical, hypothetical, and disjunctive; under the third, inductive and analogical reasoning.[1]

[1] There is much interesting matter in the details of the brief sections in which reasoning is handled, as, *e.g.*, the treatment of the syllogistic figures and of the fourth figure in particular, the parallel between induction and analogy, and the reference of both to the abstract formula of the fundamental assumption regarding intelligibility of nature; and it is important to note that Kant lends no counte-

The understanding, if one may interpret Kant freely, is the process by which the worth of what is given is fixed and determined; it moves not beyond the given fact, and can therefore subject the fact to no other than formal transformation. The determining judgment or reason is the expression of the fundamental fact in knowledge that all experience is subject to general rules or conditions; there must therefore be a determination of the particular by the general; there must be ground for subsuming the particular and the universal. The forms of such subsumption and determination of the particular by the general are syllogisms. Syllogism therefore is the mode in which the essence of cognition is made explicit. The reflective judgment is the expression of the tendency to treat the contingent details of this or that given experience after the analogy of the general rule that all experience is subject to intellectual determinations. This analogy does not necessitate the specific determination of the particular by any specific universal, but serves as general directrix in experiential researches. It is sufficiently evident that a remodelling of the older logical doctrine such as this rests upon a wider and more comprehensive philosophical view of knowledge as a whole, that such distinctions cannot flow from either of the principles previously indicated as those on which the formal conception of logic rested, and, finally, that the logical aspect of these distinctions is formal in the only true sense of that

nance to the opposition of syllogism and induction as respectively reasoning from whole to parts and from parts to whole. But the special peculiarities of his logical method are throughout those of the *Kritik*, to which reference is implicit in all that is said, and the results sufficiently show the total impossibility of successfully dealing with reasoning from the so-called independent point of view of formal logic.

word—viz., in that the treatment is of necessity general, applicable to all or any thinking.

31. As in the Kantian system there were placed, side by side, two diverse conceptions of logical system, that of transcendental logic, and that of formal logic, without any adequate link of connection between them, so from the Kantian position there diverged two quite distinct schools of logic, the transcendental or metaphysical, and the formal. As regards the second of these, but little requires to be said. The great body of logical treatises written from the Kantian formal point of view contain nothing of interest. In them the traditional logic is handled under the rubrics supplied by the Kantian general philosophy, with more or less of purifications from needless detail, according to the acuteness or insight of the writers, with more or less of deviation from the Kantian lines. In but few cases did the real difficulty, that of assigning to formal logic an independent plan and method, lead to a radically fresh treatment.[1]

The Kantian transcendental logic, being an analysis of the conditions under which objectivity in general becomes possible material for cognition, is in a special sense a new

[1] Generally, the formal logician is compelled simply to take the processes of thought as determined in psychology or metaphysics or what not, and to consider certain aspects of them. His science has, therefore, no independent place, and no method of development. Independence may be striven after, either by attempting to develop all processes of thought and their logical peculiarities from an initial definition of thought solely, or by combining with this definition the view that non-contradictoriness is the one logical quality, and thus assigning to logic the discussion of the conditions of non-contradiction in thought. Of the first, Hamilton may be taken as the type ; of the second, Twesten, Mansel, and Spalding.

theory of thought. For thought is the process mediating the unity of the ego and the multifarious detail of actual experience; and only through thought, the universal, are objects so determined that they are possible matters of knowledge for a conscious subject. As determinations of objects, the pure elements of thought may be called notions, while the realisation of notions in conscious experience is the judgment, wherein the universal of thought and the particular of sense are synthetically united, and the systemisation of experience is the syllogism. Notion, judgment, and syllogism are thus, in the transcendental logic, no bare, abstract forms, but have as their content the pure determinations of objectivity in general. They cannot be conceived mechanically, as mere products differing only in degree of generality and abstractness from the ideas and connections of association which appear as due merely to the psychological mechanism of the human consciousness. They are the essential forms of the ultimate synthesis through which knowledge becomes possible, and thus express in their organic system the very nature of thought, *i.e.*, of the thinking subject.

In the Kantian doctrine, however, as it developed itself historically, there are various points of view which disturb the harmony of the system as thus sketched. Two in particular require special notice, as from these the later attempts at a complete revision of logical theory have taken their origin. (1) Throughout the Kantian work there appears a constant tendency to regard the ego, or central unity of self-consciousness, as merely abstract, as related mechanically, not organically, to the complex of experience in which its inner nature is unfolded. This tendency finds expression in various ways. Thus the synthesis, which has been shown to be the essential feature of cognition, is

regarded as on its subjective side a union of intellectual function and receptivity of sense, and the contributions from either side are viewed as somehow complete in themselves. Knowledge, in accordance with this, might be considered to be the mechanical result of the combination or coherence of the two, a combination which in the last resort must appear to the conscious subject as contingent or accidental. (2) Knowledge, the systematic union of universal and particular in experience, is thought as containing in some obscure fashion a reference to the most real world, the realm of things in themselves, and therefore as being, in antithesis thereto, strictly subjective. The processes of thought, by which unity is given to experience, thus manifest themselves as limited in scope, and as being the very ground or reason of the restriction of knowledge to phenomenal in opposition to noumenal reality.[1]

The presence of these two difficulties or perplexities in the Kantian system, which are, indeed, at bottom but one, led to revision of transcendental logic in two directions. The one line proceeded from the analysis of knowledge as the product of intellectual function and receptivity, and, uniting therewith metaphysical conceptions of varied kinds, culminated in a doctrine of cognition which, retaining the distinction between real and ideal as ultimate, endeavoured to show that the forms of the ideal, *i.e.*, of thought, and the forms of reality were parallel. Logic, under this new conception, appeared as a comprehensive theory of knowledge, the systematic treatment

[1] It is unnecessary to consider what exactly was Kant's teaching on either of these points, or what the significance of the relative doctrine may be in his system. It is sufficient, for the historical purpose in hand, to indicate the apparent tendency of his work, for from this the later developments take their rise.

of the modes in which thought, conditioned by its own nature and by the nature of the reality upon which it is exercised, develops into knowledge, *i.e.*, of the modes in which a representation of things characterised by universality and evidential force is obtained. On the whole this is the position assigned to logic by Schleiermacher, whose view is followed in essentials, though with many variations in detail, by a large and important school of logical writers.[1]

The second direction may be characterised generally as the attempt to develop fully what is involved in Kant's conception of thought as the essential factor of cognition. Any opposition between metaphysic as dealing with the real and logic as dealing with the ideal element in knowledge appears, in this view, as a mere effort of false abstraction. The very nature of reality is its nature in and for thought. The system of pure determinations of objectivity, which Kant had imperfectly sketched, is not to be regarded as a piece of subjective machinery, because it expresses the inmost conditions of intelligence as such. Nothing is more real than the ego, than intelligence or thought. Transcendental logic, or logic which is at the same time metaphysic, is the only discipline to which the title logic by right belongs. For it contains the complete system of the forms in and through which intelligence is realised. The notion, judgment, and syllogism are doubtless forms of thought, but they have their definite content. They are the modes in which the forms of objectivity are realised for intelligence, and are thus at once abstract and concrete. The so-called formal logic

[1] See, for an enumeration of the more prominent members, Ueberweg's *Logik*, § 34, a work which itself is an admirable exposition from the same point of view.

is a mere *caput mortuum*, a descriptive study of some few types of the application of thought to matters of experience. On the whole this is the view of logic developed through Fichte (and in part Schelling) by Hegel, and the Hegelian system shall here be regarded as its complete and only representative.

VIII

LOGIC AS THEORY OF KNOWLEDGE

32. The position assigned to logic as theory of knowledge and the range of problems included in it are determined by the general philosophic view of the distinction between the reality to be apprehended by thought and the subjective nature of thought itself. There may be, therefore, numberless variations in the mode of treating logic with general adherence to the one point of view.[1]

In the *Dialektik* of Schleiermacher, for example, the fundamental characteristic is the attempt to unite some portions of the Kantian analysis of cognition with Spinozistic metaphysic. Knowledge is regarded as the complex combination of intellect, the formative, unifying, idealising faculty, and organisation or receptivity of sense. The generality or common validity of cognition rests on the uniform nature of organisation and on the identity of all ideas in the one ideal system. The objective worth of cognition is referred on the one hand to the determined

[1] It appears an historic error to identify the point of view here referred to with the Aristotelian. The notion of a parallelism between the forms of reality and the forms of knowledge is too definite to be covered by the mere expression, whether in Aristotle or in Plato, of the doctrine that knowledge is knowledge of being.

connection between the real universe and the organisation through which the individual is part of the real order of things, on the other hand to the ultimate metaphysical parallelism between the system of ideas and reality. The primary forms of knowledge, notion, and judgment, distinct from one another only as being knowledge viewed now as stable now as in process, correspond to the ultimate elements of the real, the permanent force or substance and its variable manifestations. Syllogism and induction, with the subordinate processes of definition and division, analysis and synthesis, are technical modes of the development of notions and judgments, modes by which inchoate notions are rendered definite, by which incomplete judgments are rendered complete.[1]

That there is much valuable and suggestive material in this mode of regarding logic is undoubted, and in the discussion of isolated forms of knowledge, such as judgment, it is always desirable that there should be kept in mind the reference to the ultimate character of objectivity. But the whole point of view seems imperfect and open to such objections as will always present themselves when a principle is not carried out to its full extent. It may, for propædeutic purposes, be desirable to separate the handling of logical forms from metaphysic, but such separation cannot be ultimate. The system of forms of reality to

[1] Perhaps the most complete treatment of logic from this point of view is that of George, *Logik als Wissenschaftslehre*, 1868. Ueberweg, dissenting from Schleiermacher's view of syllogism and the systematic processes of reasoning, lays out more fully what in his view are the aspects of reality corresponding to the typical forms of knowledge. Trendelenburg endeavours to fill up the gap between real and ideal by emphasising the community of character between motion, as the ultimate reality, and constructiveness in knowledge, the central activity of the ideal.

which the forms of knowledge are assumed to correspond must in some way enter into knowledge, and they cannot enter in as an absolutely foreign ingredient, to which knowledge has simply to conform itself. For, if so, these metaphysical categories would be discoverable only by an analysis of concrete knowledge, and they would remain as inferences from the nature of cognition, not as data directly known. The cardinal difficulty which appears in all treatments of logic from this point of view is that of explaining how there comes to be known an objective system of things with characteristic forms or aspects, and it is not hard to see that the acceptance of a reality so formed is but a relic of the pernicious abstraction which gave rise to the Kantian severance of knowledge from noumenal reality.[1] In short, the position taken by Schleiermacher and his school, as final standing ground, is but an intermediate stage in the development of that which lay implicit in the critical philosophy.

Moreover, it is hardly possible to assume this point of view without tending to fall back into that mechanical view of knowledge from which Kant had endeavoured to free philosophy. If there be assumed the severance between real and ideal, it is hardly possible to avoid deduction of all that is characteristic of the ideal order

[1] Thus we find in Schleiermacher (*Dial.*, §§ 132-34) that the ultimate difference of ideal and real is accepted as simple datum. In Ueberweg (*Logik*, § 8 and *passim*) there is continuous reference to an inner order of things, the forms of which are the metaphysical categories; but the actual treatment is altogether independent of these forms; and we may conjecture that, in the last resort, Ueberweg would have explained the characteristics of logical thinking by reference rather to the psychological mechanism than to a supposed nature of things (see *Logik*, §§ 40-42), and thus approximated to the position of Beneke rather than to that of Schleiermacher.

from the observed or conjectured psychological peculiarities of inner experience. The real appears only as ultimate point of reference, but in no other way determines the form of knowledge. The characteristic relations which give content to notions, judgments, and syllogisms are deduced psychologically.[1] In the long run, it would no doubt be found that the real key to the position is the belief, more or less expressed, that the systematic view of thought as comprehending and evolving the forms of reality is an unattainable ideal—that metaphysic, to put it briefly, is impossible.

To some extent this is the position taken by Lotze, whose cautious and ever thoughtful expositions are invariably directed to the elucidation of the real *nodi*, the real roots of perplexity or incompleteness of doctrine. In his view logical forms are the modes in which thought works up the material, supplied in inner experience by the psychological mechanism of the soul, in conformity to the ultimate presuppositions with the aid of which alone can harmony, or ethical and æsthetic completeness, be gained for our conceptions of things. But with this doctrine, which approaches more clearly than any other of the type to the metaphysical logic, there is coupled the reserve that any actual point of view from which the development of these presuppositions, their rational explanation, might become possible is unattainable. Our confidence in them

[1] This tendency, which appears in Schleiermacher and Ueberweg, and indeed in all the logics of that school (George's *Logik, e.g.*, is hardly to be distinguished from psychology), is prominent in Beneke. It is curious to note a precisely similar result in the logical theory of Herbert Spencer. Spencer supposes himself to be throughout referring to the nature of reality, but in fact all that is specific in the forms of reasoning developed by him is of psychological origin (see *Pr. of Psych.*, ii. §§ 302-9).

is finally of an ethical character, and depends upon our conviction of the ethical end or purpose of all the surroundings within which human life and character is manifested. In logic as in metaphysic we must content ourselves with more or less fragmentary treatment.[1]

[1] Lotze's whole view of the genetic connection of the forms of thought is peculiar to himself, and deserves separate treatment (see below, p. 194 *sq.*).

IX

LOGIC AS METAPHYSICAL

33. The peculiarities of this, the final conception of logic, are not to be deduced from the simple statement that in it no distinction is drawn between logic and metaphysic.[1] There must be understood the ultimate view of knowledge as that in which thought and reality are united, and of philosophy generally as the attempt to develop the whole system of these abstract determinations of thought by which coherence and intelligibility are given to knowledge. In it there is carried out to the full extent Kant's idea of thought as the ultimate germ of intelligibility.

In the critical system, as we have seen, the fundamental idea was continuously disturbed by the intrusion of doctrines which possessed significance only when the problems were treated from a quite opposed point of view. Thus the abstract separation of conscious experience, regulated according to the conditions of the unity of thought, from a supposed realm of reality involved the consideration of the subject as one portion or item of a mechanical whole. In other words, the Kantian system proved itself unable to unite in a comprehensive fashion

[1] For there is no such definite understanding as to what these mean as would make the statement of their identification helpful.

the two ideas of thought as the universal in experience and of thought as the activity or mode of realisation of the individual subject. The central point of view, that which refers all in experience to the unity of thought, was continuously departed from, and as a natural consequence the various forms or modes of thought were treated, not in relation to their ultimate unity, but as isolated facts, to be dealt with by principles resting on a totally opposed doctrine. It is the essence of the Hegelian method to keep continuously in view the concrete unity and totality of thought, to treat each special aspect or determination as an integral portion of an organic whole, a portion which must prove itself unintelligible and contradictory if regarded apart from its relations to the whole, and so to avoid those mechanical separations and abstractions which had proved fatal to the Kantian doctrine.

In the development of a method which rests upon and endeavours to retain so comprehensive a point of view, there must of necessity be much that is tentative and imperfect. Differences of opinion regarding the main stages in the development, regarding the particular content of any one stage, are quite compatible with adhesion to the general principle of the whole.[1] But from this point of view only can justice be done to those forms of thought which have always been regarded as the special material of logical treatment; from any other, the treatment must be partial, fragmentary, and, so to speak, external. Thus, notion, judgment, and syllogism are not, in this view,

[1] Hegel himself fully recognises the tentative character of the numerous divisions and classification of the categories of thought which make up the substance of the *Logik*, and desires that too much stress be not laid on the formal side of his exposition (see *Logik*, i. 29).

treated as merely subjective modes in which the individual consciousness apprehends and works up the material of experience, but as higher, more developed, and therefore richer forms of the determinations of thought in and through which intelligibility of experience is acquired. The whole system of these determinations of thought, the categories, is the matter of logic; the realisation of them in subjective experience, or the treatment of the successive phases of consciousness in which abstract thought comes to be recognised in and by the individual, is the matter of the philosophy of spirit, of which psychology is one portion. Doubtless the logical treatment may be led up to by tracing the modes in which the full consciousness of the determinations of thought as the essence of reality is attained, but such introduction is propædeutic merely; and within the logical system itself the starting-point must be the simplest, least definite of those categories whereby for spirit the realm of fact becomes intelligible.

The nature of the opposition between this view and that of the ordinary logic, which in the main rests upon the principle of individualist psychology, that the content of knowledge is derived *ab extra*, from an entirely foreign world of fact, will become more clear if there be considered specially the treatment which under the two methods is given to the notion. Notions, in ordinary logic, are regarded as products formed from the data supplied by presentative and representative experience, and the mode of formation as generally conceived is a continuous process of critical comparison, recognition of differences, similarities, and grouping of like facts. Not only then does the notion present itself as relatively poor and meagre in content, a kind of attenuated individual, not only are the only

characteristics presented to the operation of thought mechanical and external, but the final product appears as a mere subjective abbreviation of what is given in experience.

In the process, however, even as it is ordinarily conceived, there is more involved than is apparent on the surface. The individuals subjected to the abstracting and generalising activity of thought are *qualified* individuals, *i.e.*, individuals viewed as determined in their own nature and in respect of thought by a whole network of relations, which when stated abstractly are really of the nature of categories. They are individuals only for a unifying intelligence which views them under diverse aspects, and these aspects are the blank forms of intelligibility, which it is the very function of logic to consider in system. Moreover, the purely formal acceptation of the notion as a mere mental hieroglyphic or sign stands in sharp contradiction to the view which as a rule accompanies it, and which, for the most part, receives explicit statement in a so-called applied logic or doctrine of method, that in the notion is contained the representation of the essence or truth of reality. It is impossible to retain with any consistency the merely arithmetical or numerical doctrine of the notion, as containing fewer marks than the individual, of the genus as characterised by a less number of attributes than the species, and so on. Underlying all genuine knowledge, all classification, and therefore all formation of notions, is the tendency towards the subordination of parts to a law which determines them. The generic attributes are not simply the points of agreement, but the determining characteristics, and the notion of a thing is the explicit recognition of its nature as a particular manifestation of a universal law.

Thus, even within the limits of the ordinary logic, there are problems which force upon it the reconsideration of the view which regards the notion as merely a mechanically formed psychical fact. Knowledge, no doubt, is only realised subjectively in and through psychical facts; but the treatment of it in its nature as knowledge, and the treatment of its psychical aspect, are *toto genere* distinct. The metaphysical doctrine which keeps consistently in view thought as the essence of knowledge in its own nature has therefore to contemplate the notion in strictest relation to thought, as one mode in which objectivity as such is apprehended, made intelligible, and, in a very special sense, as the mode in which the nature of thought is made explicit. Thus the notion can only appear as uniting and comprehending under a new aspect those intellectual determinations whereby things are related to one another in a cognisable system.

The special characteristic of the Hegelian logic, the methodical principle of development of the determinations of thought, requires for its full elucidation a longer treatment than is compatible with the scope of a general sketch. But it seems necessary to add a word respecting certain difficulties or objections which apply, not specially to the methodical principle of Hegel's logic, but generally to the idea of a logic which is at the same time metaphysic or a treatment of ultimate notions. These objections may be variously put, according to the special point of view assumed by the critic, but they are in the long run dependent on one mode of interpretation of the fundamental antithesis between being, or reality, and thought. For, whether we say that it is confusion to identify thought-forms with relations of fact, that it is unphilosophical to assume that being of necessity conforms to thought, that thought

is purely subjective and knowledge the system of forms in and through which the subjective is brought after its own nature to an adequate representation of objective fact, or point to phenomena of perception as showing that even adequate correspondence, not to speak of identity, between subjective and objective must be matter of discussion, or lay stress upon the procedure of science as negativing the preliminary assumption of the logico-metaphysical assumption, we but express in varied ways a fundamental interpretation of the opposition between reality and knowledge. We assume an initial distinction, the grounds and precise nature of which are never made clear. For the antithesis between thought and reality is an antithesis in and by means of conscious experience, and is not to be comprehended save through conscious experience. If, indeed, we start with conscious experience as a mechanically formed *tertium quid*, something which arises out of the correlation of an unknown subject and an unknown object, we may certainly retain, as an ever-recurring and insoluble problem, the possibility of cognising either factor *per se*.

But the problem arises not from the antithesis but from our way of reading or interpreting it. Opposition between subjective thinking and the real world of fact, slow, tentative, and imperfect development in individual consciousness of knowledge which contains in essential relation the opposed elements, distinction therefore of the metaphysical or real categories which determine the nature of objects as knowable from the ideal or logical categories which express more specifically the fashion in which the knowable object is reduced to the subjective form of cognition, are not only perfectly compatible with, but are strictly reasoned conclusions from, the ultimate doctrine that in thought alone

is to be found the secret both of knowing and of being. To bring against this doctrine the continuous complaint that it assumes an identity which, if it can be proved at all, at least demands proof, is to misunderstand the very notion of identity which plays so important a part in the objection. Not even in the most judicious and thoughtful critics of metaphysical logic, in Lotze for example,[1] does one find a sufficiently careful distinction between a mere question of nomenclature (*i.e.*, whether we shall restrict the title *logic* to the portion of general system which deals with notions, judgments, and syllogism, while reserving for metaphysics all the other inquiries) and the question of theoretical importance, whether there remains, over and above the difference between the more immediate determinations of thought and its more complex or reflective modes, an essential difference in knowledge between thought and reality. In less careful critics the oversight simply leads to the contention that we shall always repeat the problem of knowing and being as insoluble, and shall view knowledge as a mechanical, subjective product.

Many of these objections doubtless result from a very simple fact, already more than once alluded to. Particular distinctions, apparently the most elementary, frequently involve and are unintelligible apart from a developed, though not necessarily consistent or well-grounded, conception of things in general. Thus the emphasis laid upon thought as essentially subjective, as being merely the system of operations whereby the individual brings into order and coherence in his own experience what is furnished *ab extra* through the natural connection in which he is placed to the objective world,

[1] See his *Logik* (1843), pp. 10, 11, and *Logik* (1874), bk. iii., chaps. 4, 5.

seems at first sight the most simple and direct consequence of the actually given distinction between the individual as one natural unit and the sum of things comprehending him and all others. But, on analysing more closely the title for applying to philosophical problems a view which is that of practical life, and doubtless legitimate and necessary within that sphere, we readily become aware of a whole series of speculative assumptions implicit in that view, and possibly without any adequate justification. At all events, whether or not the view be ultimately defensible, and in the same form in which it is at first assumed, it is unphilosophical to start in the treatment of a difficult and important discussion from principles so ambiguous and undetermined. The practical difference between the individual agent and the external sphere within which his individual operations are realised and which is therefore treated by him, from his point of view, as external, throws no light *per se* on the nature of the ultimate relation between the individual thinker as such and the world within which his thought is exercised. The confusion between ultimate distinctions and practical points of view is productive of most pernicious consequences not only in logic specially but in philosophy at large.

X

CRITICISM OF THE CHIEF LOGICAL SCHOOLS

34. It will probably be now apparent that determination of the nature, province, and method of logic is, and has always been, dependent on the conception formed as to the nature of knowledge. Discussions regarding the precise definition of logic are not mere analytical disputes regarding the best mode of expressing in terms the nature of a subject sufficiently agreed upon; variations in the treatment of particular portions of logical discipline do not arise from more or less accurate discrimination of the nature and relations of given material; nor are differences in respect to the amount of logical matter to be considered mere expressions of difference as to the range of the same fundamental principles. The grounds for divergence are much more deeply seated; and, looking back upon the historical survey of the main conceptions of logical science, it seems quite impossible to hope that by comparison and selection certain common points of view or methods may be extracted, to which the title of logical might beyond dispute be applied. It results, moreover, from this fact that criticism of various logical views cannot be conducted by the method of bringing each in turn before a recognised rule or established opinion respecting the contents and methods of logical science.

The logic, as one may call it, of each philosophical theory of knowledge is an integral part or necessary consequence of such theory; and its validity, whether in whole or in part, depends upon the completeness and coherence of the explanation of knowledge in general which forms the essence of that theory.

The course of the preceding historical survey has brought before us a variety of conceptions of logic resting on various doctrines of knowledge; and, had it been possible to include in these historic notes references to the several treatments of details—such as classification of notions, analysis of judgments, system of reasoning, and methods of proof—an equal variety in special points would have been apparent. Any criticism of a general conception of logic or special application thereof, which does not rest upon criticism of the theory of knowledge implied in it, must be inept and useless.

It is not possible to include such expanded criticism in the present work. There remains therefore only one aspect of these various logical schemes which may be subjected to special and isolated examination, viz., the inner coherence of each scheme as presented by its author. Naturally such an examination can be applied only to views which imply the separate existence of logic as a body of doctrine developing into system from its own peculiar principles. When it is a fundamental position that logic as such has no separate existence, but is one with the all-comprehensive doctrine or theory of the ultimate nature of cognition, it is not possible to criticise such conception of logic separately; criticism of logic then becomes criticism of the whole philosophical system. In most of the views brought before us, however, a special place has been assigned to logic; it has been placed in various relations

to the allied subjects of psychology and metaphysics, but with a certain independence ; and its contents have been assumed to follow in some way from its own special principles. It is therefore possible to apply internal criticism to the more important of these general views, and to consider how far the pretensions of logic to an independent position and method are substantiated.

From the foregoing remarks it will also have become apparent that a general classification of logical schools, as opposed to the reference of these to ultimate distinctions of philosophical theory, is impossible. A distribution into formal (subjective), real (empirical, or, as German authorities designate it, *erkenntnisstheoretisch*), and metaphysical conceptions of logic is rather confusing than helpful. For the formal logics of the Kantian writers, of Hamilton, and of Mansel are distinct, not only from one another, but from such equally formal logics as those of Hobbes, Condillac, Leibniz, Herbart, Ulrici, Boole, De Morgan, and Jevons. Logic as theory of knowledge presents quite special features when handled by Mill, or by Schleiermacher, Ueberweg, Beneke, and Wundt. And it cannot even be admitted that the threefold classification affords room, without violence, for the Aristotelian logical researches. There are no points of agreement and difference so unambiguous that by their aid a division can be effected.[1]

35. Few conceptions of logic contain, with so little real ground, such professions of completeness and independence

[1] Nor are more detailed classifications, such as those of Rosenkranz (*Die Modificationen der Logik*, 1842), Prantl (*Die Bedeutung der Logik*, 1849), Rabus (*Neueste Bestrebungen*, 1880), of service, except when historical.

as that developed in the writings of the Kantian school.[1] According to this view, logic is a pure science, having as its special material the form of thought, demonstrative in character and with theorems capable of complete deduction from the elementary principles contained in the very notion of form as opposed to matter of thought. But, when one comes to the examination of the system itself, one finds (*a*) that the notions of form and matter are much too stubborn to lend themselves readily to analysis, and that explanations of what exactly constitutes form fluctuate between a merely negative definition (whatever is not treated in any other science, philosophical or otherwise) and a psychological deduction from the assumed nature of thought;[2] (*b*) that the really important factor in determining the contents of logical science is psychology, from which much more is borrowed than the mere preliminary definition of thought; (*c*) that demonstrative character rests entirely on an abstract interpretation of the laws of identity and non-contradiction; (*d*) that throughout the whole system there is not a trace of development, but merely the reiterated application of the law of identity and contradiction, or of some confused distinction between form and matter, to logical products—the notion, judgment, and syllogism—whose nature, characteristics, and distribution are arbitrarily accepted from psychology or general criticism or what not.

Thus, in the majority of cases, logicians who simply followed the lines indicated by Kant introduced into their

[1] Under this head Kant himself, for reasons above given, is not included; the writers referred to are named in Ueberweg (*Logik*, § 34).

[2] Mill's criticism on Hamilton's confused statements regarding forms (*Exam. of Hamilton*, 438-454), is perfectly applicable to the generality of the Kantian treatises on logic.

system, without any criticism, the fundamental distinctions contained in the *Kritik der reinen Vernunft*. The fourfold scheme of quantity, quality, relation, and modality was applied without hesitation, though in varied and always artificial fashion, to notions;[1] judgments were accepted as being categorical, hypothetical, and disjunctive in kind, though the differences are altogether foreign to the logical principles applied; and generally no attempt was made to do more than treat, in an abstract fashion, some aspects of a procedure of thought determined in all its phases by extra-logical considerations. The inevitable result of such a treatment was the undue preponderance given to the doctrine of notions, which, being viewed after the fashion of Kant as given, completed products, appeared as the ultimate units of thought, to be combined, separated, and grouped together in all the higher processes.

The peculiarities of the logical system which is commonly associated with the name of Sir W. Hamilton spring entirely from this view of notions. For, if notions be regarded as the elements of thought, then the judgment which elaborates them can only present itself as the explicit statement of immediate relations discernible among notions. These immediate relations reduce themselves, for Hamilton, to one—the quantitative relation of whole and part—and, attention being concentrated on the extensive reference of concepts, the eightfold scheme of propositional forms is the natural consequence. To such a scheme the objections are manifold. It is neither coherent in itself, nor expressive of the nature of thinking, nor deduced truly from the general principle of the Hamiltonian logic. For it ought to have been kept in mind that extension is but an aspect of the notion, not a separable fact upon which the logical

[1] See, *e.g.*, Krug, *Logik*, § 25 *sq.*

processes of elaboration are to be directed. It is, moreover, sufficiently clear that the relation of whole and part is far from exhausting or even adequately representing the relations in which things become for intelligence matters of cognition; and it is further evident that the procedure by which types of judgment are distinguished according to the total or partial reference to extension contained in them assumes a stage and amount of knowledge which is really the completed result of cognition, not that with which it starts or by which it proceeds.[1]

The utility of basing logical theorems on psychological premisses, a method involved in the procedure of most expositions of formal logic, may well be matter of doubt. For psychology, as ordinarily conceived, has certainly close relations with logic, but in aim and in point of view is distinctly opposed or at all events subordinate to it. The psychological investigation of thought, if carried out consistently, must take one of two forms: either that of description, in which thought, like any other mental fact, is regarded *ab extra* as that upon which attention and observation are to be directed,—in which case therefore any relations of thoughts among themselves must be of such an external nature as can be presented in the field of observation; or that of genesis, development, in which the

[1] The extension of a notion has no numerical or quantitative definiteness. To formulate the judgment as expressing definite amounts of extension, therefore, presupposes complete empirical survey of what, by its very essence, remains incomplete. This is specially noteworthy in the case of Hamilton's particular judgments. A judgment such as *only some A is all B* assumes total and perfect knowledge of the whole spheres of A and B. It is in the strictest sense of the word *universal*. Hamilton, it may be added, finds it completely impossible to work out a coherent doctrine of syllogism from the point of view taken in the treatment of the judgment.

subjective processes of mind are viewed as forms of the one great process whereby knowledge is realised in the individual consciousness. Investigations from the first point of view are diametrically opposed to the logical treatment of thought; for in the latter the essential feature, the reference in the subject, with his mental forms, to an objective order within his experience, is entirely wanting. Such investigation is abstract; it proceeds upon and remains within the limits of a distinction drawn in and for conscious experience, a distinction the grounds, significance, and modes of which require to be treated by a larger and more comprehensive method. Investigations from the second point of view are subordinate to logic in the wider sense; for the treatment of the subjective processes therein is illuminated and determined by the general principles regarding the nature and meaning of conscious experience which it is the sole function of logic to bring forward and establish. The psychology which Hamilton generally has in view is that commonly called empirical, and with his conception of it the two sciences, logic and psychology, are really one.

36. A possible exit from the difficulties or assumptions of the current Kantian logic may be sought by following out and consistently applying the hint contained in Kant's distinction of analytic and synthetic thought, analytic and synthetic truth. It may be said that all thinking involves the fundamental laws of identity and non-contradiction; that in these laws only is to be found the characteristic and most general feature of thought; that in them only is the form, or element contributed by mind itself, to be detected. Logic would thus be regarded as the explicit statement of the conditions of non-contradictoriness in thought, as the

evolution of the formal element in thought, and, since in analytic truth only can non-contradictoriness be discovered without material aid, as the theory of analytic thought. Such is the position assigned to logic by Twesten, Mansel, Spalding, and some others; and the consequences to which it inevitably leads are sufficiently interesting to require that some special examination should be given to it.

In the first place, then, it seems evident that the fundamental distinction implied, that between analytic and synthetic thought, is wrongly conceived. That analysis and synthesis are methods of cognition, differing in many important respects, is undoubted; but such difference lies in a sphere altogether alien to that within which the present distinction is to be sought. Analytic thought, as here conceived, is only to be understood when taken in reference to the judgment, and then also in reference to a peculiarity in the Kantian doctrine. Kant, emphasising the principle that judgment is essentially the form in which the particular of experience is determined by the universal element of thought, but identifying this universal with a formed concept (resembling, therefore, a class notion), contemplated a class of judgments in which the predicate was merely an explication of the subject notion. Such judgments, had the matter been more fully considered, would have appeared as far from primary; and Kant has himself, in the most unambiguous language, indicated the correct view that analysis is consequent and dependent on synthesis — that analytic judgments, therefore, are merely special applications of abstracting thought within a sphere already treated, handled, formed by thought. Mansel, too, whose views are generally acute if not profound, has signalised as the primitive unit of cognition the so-called psychological judgment, which is essentially synthetic in

character. The logical judgment, in fact, about which his conception of logic centres, is recognised as a posterior act of reflection, directed upon formed notions, and is not in any way to be regarded as containing what is a common, universal feature of all judgments.

In the second place, even granting what cannot be maintained, that the process of thought is mere explication of the content of previous knowledge, and that the theory of logic has to do with a comparatively small and subordinate portion of cognition, there is in such a principle no means of development. We may take up in succession class-notions, judgments, reasonings, and in relation to each reiterate, as the one axiom of logic, that the constituent elements shall be non-contradictory; but such a treatment is only possible in relation to a material already formed and organised. The utmost possible value being given to such a view, logic, under it, could be but a partial and inchoate doctrine.

Finally, there is involved in the doctrine of analytic thought, and in the consequences to which attention will next be drawn, a peculiar and one-sided conception of identity or of the principle of identity as an element in thought. Historically this conception has played a most important part: it lies at the root of all nominalist logic from Antisthenes downwards, and has found metaphysical expression of the most diverse kinds. *That things are what they are* is the odd fashion in which a wellnigh forgotten English writer states what is taken to be the universal foundation of all thought and knowledge.[1] The

[1] John Sergeant. See *The Method to Science*, by J. S., 8vo., Lond., 1696, pp. 144, 145. This curious book contains much interesting matter. Sergeant regards inference as "the establishment of identity between extremes by identity with the middle" (p. 227);

representatives of things in our subjective experience, the units of knowledge, may be called notions, and, accordingly, that each notion should be what it is appears as the corresponding logical axiom. The whole process of thought is therefore regarded as merely the explicit statement of what each notion is, and the separation of it by direct or indirect methods from all that it is not. The judgment, essentially the active movement of thought, is reduced to the mere expression of the identity of a notion, and in truth, were the doctrine consistently carried out, Antisthenes's conclusion that the judgment is a fallacious and inept form of thought would be the necessary result. When such a conclusion is not drawn, its place is generally taken by much vague declamation regarding the limited, imperfect, and uncertain character of our knowledge, which is regarded as asymptotically approaching to the adequate determination of truth.

The conception which underlies this view is the abstract separation of thought from things which has been already noted, but the proximate principle is a deduction there-

rejects the second and third figures, and indeed figure at all (p. 233); reduces all modes of inference, hypothetical and others, to one type (p. 247); considers that all truths are identical propositions (p. 267), even the causal relation being of the nature of an identity (pp. 144-5); and concludes with that which is an inevitable consequence of this doctrine, viz., that knowledge of one fact in nature implies knowledge of all nature (p. 269). Much modern criticism of plurality of causes is anticipated here, as indeed it rests on the same abstract conception of identity. If the whole universe be the cause at any one moment, it is perfectly clear that "plurality of causes" is a contradiction in terms; but so, for that matter, would *cause* be under a like condition. The universe is the universe; things are what they are; our thinking is ultimately an incessant reiteration of the same, A, A, A. Sergeant is acute enough to see what many modern critics have not perceived, that the notion of change is endangered by such an abstract principle (see pp. 305-6).

from. Knowledge or thought is treated externally as a series of isolated units or parts, and the results of cognition —notions, judgments, and reasonings—are viewed as the constituent factors. Thus, *e.g.*, when it is said that a judgment is the expression of an identity, there are possible only two modes of explanation: the one, that the identity referred to is that between the original notion (subject) as unqualified by its predicates and the same as qualified, in which case manifestly the result of the judgment is taken as being its constituent essence; the other that the identity is that of the applicability of distinct names to the same fact, in which case we accept without further inquiry and exclude from logical consideration the processes of thought by which the application of names is brought about, and assume as being the procedure of thought itself that which is its consequence. Under all circumstances, difference is as important an element as identity in the judgment, and to concentrate attention upon the identity is to take a one-sided and imperfect view.[1]

37. So soon, however, as the real nature of thought has been thrown out of account as not concerned in the processes of logic, so soon as the law of non-contradiction in its manifold statement has been formulated as the one principle of logical or formal thinking, there appears the possibility of evolving an exact system of the conditions of non-contradictoriness. The ultimate units of knowledge, whatsoever we call them, whether notions or ideas of classes or names, have at least one characteristic: they are what they are, and therefore exclude from themselves

[1] On Condillac's attempt to treat judgments as identities (or equations) some excellent remarks will be found in De Tracy, *Idéologie*, iii. 133-143, *cf.* Duhamel, *Des Méthodes*, i. 89-94.

whatever is contradictory of their nature. They are combined positions and negations, that which is posited or negated being left undetermined,—referred, in fact, to matter as opposed to form. With respect to any article of thought, therefore, the only logical requirement is that it shall possess the characteristic of not being self-contradictory, and the only logical question is, what exactly is posited and negated thereby. Complex articles of thought viewed in like manner as complexes of positions and negations may have the same condition demanded of them and the same question put regarding them. A judgment and a syllogism, if narrowly investigated, will appear to be merely cemplex articles of thought, complexes of positions and negations.

Proceeding from such a conception there may be treatments more or less systematic and fruitful. In the hands of Kantian logicians, such as Twesten, Mansel, Spalding, and the like, little is effected, for, as the forms of thought are accepted as giving and as having their characteristics otherwise fixed (by psychology or critical theory of knowledge), the treatment resolves itself either into repetition, in respect to each, of the fundamental logical condition, or into the erection of a specific kind of thought (analytical) which has no other feature save that of correspondence with the said condition. But it is clear that restriction by any psychological or critical doctrine of thought is an arbitrary limitation. It is needful only to regard the operation of thought as establishment of positions and negations, and to develop, by whatever method, the systematic results of such a view. Hobbes's doctrine of thought as dealing with names and as essentially addition and subtraction of nameable features, Boole's doctrine of thought as the determination of a class, Jevons's view of thought as simple

apprehension of qualities, — any of these will serve as starting-point, for in all of them the fruitful element is the same. The further step that the generalisation of the system of thought must take a symbolic form presents itself as an immediate and natural consequence.

38. By the application of a symbolic method is not to be understood what has been practised by many writers on logic—the illustration of elementary logical relations by numerical or algebraic signs or by diagrammatic schemata. The expression has the signification which it bears in mathematical analysis, and implies that the general relations of dependence among objects of thought, of whatsoever kind, in correspondence with which operations of perfectly general character are carried out, shall be represented by symbols, the laws of which are determined by the nature of these relations or by the laws of the corresponding operations. The mere use of abbreviations for the objects of treatment is not the application of a symbolic method ;[1] but so soon as the general relations of, or general operations with, these objects are represented by symbols, and the laws of such symbols stated as deductions therefrom, there arises the possibility of a symbolic de-

[1] Thus one would not describe Aristotle's use of letters for the terms of his syllogisms, nor the current logical abbreviations of S, P, and M in like case, as being, in any true sense of the word, symbolic. On the subject generally, the instructive work of Mr Venn (*Symbolic Logic*, 1881) should be consulted. Mr Venn has not only in this work expounded the foundations and main theorems of Boole's logic with a care and skill that leave nothing to be desired, but he has, independently of many real contributions to logical analysis, put in its true light the nature of symbolic method in logic. He has rendered it impossible, even for the outsider, to complain that symbolic logic is an arbitrary application of mathematical method to logical material.

velopment or method of treatment, which may lead to more or less expanded results according as the significance of the symbolic laws is more or less general. Thus quantity, whether discrete or continuous, presents, as an aspect of phenomena, relations of a highly general kind, offers itself as object of operations of a highly general kind, and is therefore peculiarly the subject of symbolic treatment.

Currently, indeed, the treatment of quantity is assumed to have the monopoly of symbolism; but such an assumption is not self-evidently true, and it is permissible to inquire whether matters non-quantitative do not present relations of such generality that they, too, can be symbolically dealt with. It is, however, a further question whether the generality of the relations and therefore the significance of the symbols in such cases, although subject to some special conditions not necessarily involved in the nature of quantity, do not spring from the fact that we treat the matters as quantities of a special kind, and so insensibly find ourselves applying quantitative methods. In other words, it remains to be investigated, after the preliminary definitions and axioms of any symbolic method have been laid down, whether the conception of thought with which we start, or a special feature distinctly quantitative in character, has been the truly fruitful element in after-development of the system.[1]

The first step in any symbolic logic must evidently be the determination of the nature and laws of the symbols; and, as these follow from the nature of the operations of thought, the first step is likewise a statement of the essential characteristic of thinking. As above noted, there have been adopted various modes of expressing this character-

[1] An excellent note on symbolic logic will be found in Lotze, *Logik* (2nd ed., 1880), pp. 256-59, Eng. tr., pp. 208-23.

istic, and in some cases the mode adopted is not one from which any generally applicable symbolic rules of procedure could have followed.[1] Two only require here to be noted, as representing special views: first, that which proceeds from the idea of thought as essentially the process of grouping, classing, determining a definite set of objects by a mark or notion; and second, that which proceeds more generally from the conception of thought as consisting of a series of self-identical units, to be variously combined in obedience to the law of self-identity.[2] Adopting the first view, we find that processes capable of symbolic representation, by the customary algebraic signs of addition, subtraction, equivalence, multiplication, and division, have a perfectly general significance in reference to the combination, separation, equalisation of classes, to the imposition and removal of restriction on a class; that to the symbols there can therefore be assigned a set of general laws; and that any peculiarity of these symbolic laws which differentiates them from the laws of like symbols in mathematical analysis is deducible from the notion of thought with which we started, and is consequently to be carried along with them in all the after development.[3]

[1] Some of these, as *e.g.*, Lambert's and Ploucquet's, are noted and discussed by Mr Venn (*Symbolic Logic*, xxxii.-xxxvi. and *passim*).

[2] The first is the view taken by Boole (and expounded with great fulness in Venn, as above); the second is that of the brothers Grassmann (in the *Formenlehre*, 1872, especially bk. ii., *Die Begriffslehre oder Logik*). I do not specially note Jevons's theory, otherwise one of high interest and leading to many elegant and ingenious processes, for it appears to me, while not absolutely coinciding in statement with that of either Boole or Grassmann, to be covered by what is special to each of them, and to be valuable mainly as a simplification in certain particular directions.

[3] Mr Venn, in his exposition of Boole, has done much to clear up the significance and laws of the symbol for division. I am inclined

Symbolic representation of relations of classes follows with equal directness from the general notion that by any such relation a new group is determined in reference to the original groups, or rather that the position or negation of a new group (or series of groups) is given, definitely or indefinitely, as the result of such a relation.

With the aid of the symbolic laws so reached, the logical problem as such may then be approached. Given any number of logical terms (*i.e.*, classes, or, as it may be better put, positions and negations) connected together by any relations, to determine completely any one in reference to the others, or to express any one in terms of the others. The symbolic procedure, expounded with marvellous ingenuity and success by Boole, may take various forms, and may be simplified by many analytical devices, but consists essentially in determining systematically how given positions and negations, definite or indefinite, combine with or neutralise one another. A more detailed account of these formal processes is beyond our limits.[1]

The first question which suggests itself in connection with Boole's symbolic logic is the necessity or advisability of retaining the reference to classes, or the description of thought as classification. Do the symbolic laws really depend to any extent on the logical peculiarities of class

to think that it would be quite in accordance with Boole's idea to assimilate multiplication and division to the familiar logical processes of determination and abstraction (as indeed is hinted by Mr Venn, *l. c.*, p. 80). For these processes can, from the special point of view, relate only to the subdivision of a class in extension, and have no reference to the usual distinctions of connotation and denotation.

[1] Mr Venn's work is here again invaluable. Jevons's *Principles of Science* and *Studies in Deductive Logic* should be consulted. Schröder's *Operationskreis des Logikkalculs* contains some very elegant and simple methods.

arrangement? Mr Venn, who emphasises this feature in Boole's scheme, has, however, done good service in leading up to a different explanation. The general reference to objects, which is also noted as implied in all Boole's formulæ, has nothing to do with the possible difference of conceptualist or materialist doctrines of the proposition; and, in fact, as all distinctions of thing and quality, resemblance and difference, higher and lower, subject and predicate vanish, or are absorbed in the more general principle underlying the symbolic method, phrases such as classification, extension, intension, and the like should be banished as not pertinent. Nay, the usual distinctions of quantity and even of quality either disappear or acquire a new significance when they are brought under the scope of the new principle. "What symbolic logic works upon by preference is a system of dichotomy, of x and not x, y and not y, and so forth."[1] In other words, quantitative differences require to find expression through some combination of the positions and negations of the elements making up the objects dealt with,[2] while the usual qualitative distinctions are merged in the position or negation of various combinations.

The whole phraseology then of classification and its allied processes seems needless when used to denote the simple determination of objects thought. The literal signs express, not "classes," but units, determined in and for thought as self-identical. For this reason then it appears that the view of the foundations of the symbolic methods of logic taken in Grassmann's *Begriffslehre* is more

[1] Venn, as above, p. 162.

[2] Where this is impossible, as in the case of the truly particular or indeterminate judgment, symbolic methods encounter almost insurmountable difficulties.

thoroughgoing, and more closely represents the underlying principles, than that involved in Boole's formulæ and expounded in detail by Mr Venn.[1]

Grassmann, as above stated, deduces logical relations as a particular class of the determinations necessarily attaching to all quantities (*i.e.*, determined contents of thought). Abstraction being made of all peculiarities which may be due to their special constitution, quantities exhibit certain formal relations when they are combined (added, subtracted, &c.). Each quantity is a unity of thought, a definite *positum*, and of such units there are but two classes, elements and complexes. Units of thought, which are self-identical, and therefore subject to the specific law

[1] For this reason we think that Mr Venn's criticism of the intensive reading of logical terms is somewhat beside the mark. Beyond a question, if the point of view from which intension has any significance and importance be adopted, the relations of notions in intension would be impracticable for symbolic handling; but from this point of view no such separation between extension and intension as Mr Venn contemplates is possible. The objects with which symbolic logic can deal, and the relations of which it can take into account, are determined units, in respect to which difference between their qualities as recognised and things possessing them is inept. *A* for symbolic logic, is simply a definite position, with the function of excluding not-A, and the capacity for entering into combination with anything that is not *A*. It might be a class, or an individual, or a group of qualities, or a single quality, and in any case must be dealt with symbolically in connection with others of like kind; *i.e.*, if I call A a quality, I must deal throughout with qualities, and allow no intensive questions as to the results of combination on classes, or groups of things. It is evident also that, under any view of logic, our cognition of things or classes must start with attributes; and the possibility or impossibility of combination, the extent determined by any combination, depend on the relations of possibly combined position or of exclusion between the constituent attributes. Much of Mr Venn's criticism of Jevons's method involves oversight of this fundamental point.

that addition of each to itself or multiplication of it by itself yields as result only the original unit, are notions. The theory of notions, therefore, is the development of the general formal relations of units under the special restrictions imposed by their nature.[1]

There appears very clearly in Grassmann's treatment the essence of the principle on which symbolic logic proceeds. Thought is viewed as simply the process of positing and negating definite contents or units, and the operations of logic become methods for rendering explicit that which is in each case posited or negated. To apply symbolic methods, we require units as definite as those of quantitative science, and the only laws we can employ are those which spring from the nature of units as definite. Now it seems a profound error to reduce the whole complex process of thinking to this reiterated position of self-identical units. Undoubtedly, if we start from any given fact of thought, as, *e.g.*, a judgment, and inquire what can be exhibited as involved in it, we have before us a problem of analysis, the solution of which must take form in a series of positions and negations; but our thinking is not therefore as a whole mere analysis. The synthetic process by which connections of thought among the objects of our conscious experience are established is not the mechanical aggregation of elementary parts. The relations which give intelligible significance to our experience are not simply those of identity and non-identity. It is an altogether abstract and external view of thought, resting in all probability on an obscure metaphysical principle,[2] that would treat it as in essence the composition and decomposition

[1] See *Die Begriffslehre oder Logik* (1872), p. 48. Schröder (*op. cit.*) follows Grassmann, though with the use of *class* phraseology.

[2] As above noted, p. 147 *sq.*

of elementary atoms, of πρῶτα as Antisthenes would have called them. It has, indeed, been imagined that a symbolic logic might be developed which should be independent in all its fundamental axioms of any metaphysical or psychological assumptions ; but this is an illusion. No logical method can be developed save from a most definite conception of the essential nature and *modus operandi* of thinking ; and any system of symbolic logic finds it necessary, if it is to be complete and consistent, to adopt some such view as that above criticised, to regard thought as purely analytic, as dealing with compounds or units which are themselves highly complex products, only to be formed by a kind of thought not recognised among logical processes.[1]

39. Formal logic, then, in the ordinary acceptation of that term, does not appear to furnish any adequate representation of the real process and method of thought. Any logical theory must of necessity be formal, *i.e.*, abstract or general ; for it can consider only the general elements of thought, not specific knowledge in which are involved the finite, limited relations of one fact or class of facts to another. The distinction between logic and the sciences is therefore precisely that between philosophy in general and the sciences. Attempts have been made to include in logical analysis the treatment of scientific method, *i.e.*, to discuss as matter of logic the varied processes by which scientific results have been attained. It is true that logical consideration must extend to the notions through which scientific experience, like any other,

[1] The same fact has been noted in regard to formal logic of the Kantian school, as, *e.g.*, in Mansel's distinction of psychological and logical judgments.

becomes intelligible, and, in so far as scientific method is but the application of the laws of knowledge as a whole, it is a possible, nay necessary, object of logical treatment. But to include scientific methodology in particular, the consideration of the mechanical devices by which we strive to bring experience into conformity with our ideal of cognition, the discussion of methods of experiment and observation, under the one head logic is an error in principle, whether we view logic in its theoretical aspect or in reference to a special propædeutic aim. Generalisations on such topics are wellnigh worthless; they can have vitality and importance only when drawn in closest conjunction with actual scientific work. The theory of scientific method is either doctrine of knowledge treated freely or else the application of thought in connection with actual research and the ascertainment of the principles therein employed. In either case it is not susceptible of abstraction and isolated treatment.

40. There remains only, of the possible views noted, that which identified logic with the theory of knowledge, but which so defined theory of knowledge as to distinguish it from metaphysics. The designation of logic as theory of knowledge is one to which in words there can be no possible objection. It brings into the foreground what it has been the object of this article, by an historico-critical survey, to establish, that so-called logical laws, forms, and problems are hardly capable of statement, certainly incapable of satisfactory treatment, except in the most intimate connection with the principles of a theory of knowledge. To include, however, in the signification of this latter term a peculiar conception of the relation between thinking (knowing) and reality is at once to restrict the scope of

logic and to place an arbitrary and, one would say, an ill-founded restriction on the kind of treatment to which logical problems may be subjected. If it be really the function of logic to trace the forms and laws of knowledge, that function is all-comprehensive, and must embrace in its scope all the fundamental characteristics of experience as known. But no characteristic of experience is more palpable than the distinction, drawn within conscious experience, between knowledge and reality. It is impossible then for a theory of knowledge to start with the assumption that these two exist separately, constituted each after its special fashion, but with a certain parallelism between them. In words one may refer for justification of the assumption to metaphysics, or to psychology, but, in fact, the problem so relegated to some other discipline is essentially a logical question, and the method of its solution exactly that which must be applied in the treatment of subordinate logical questions. Practical convenience alone can lead to any separation of the problems which under this view are referred in part to theory of knowledge and in part to metaphysics. Other and more serious difficulties of the view have been already commented on.[1]

41. In sum, then, the problems and the methods which compose logic in the strictest sense of that term seem to be one with the problems and methods of the critical theory of knowledge. No other title describes so appropriately as that of "logical" the analysis of knowledge as such, its significance and constitution, in opposition to the quasi-historical or genetic account for which the title psychological should be retained. Were such analysis to be described as "transcendental," no objection could be

[1] Above, p. 127 *sq.*

raised other than that bearing on the advisability of using a special term where a more general one is amply sufficient. Were such analysis described as prevailingly "metaphysical," the only answer could be that the term "metaphysical" has had and has many a signification, and that it is well to avoid the use of an ambiguous and question-begging epithet. Abstract speculations about the nature of reality, essences, and what not are as foreign to a genuine metaphysic as to a commonplace logic. The researches to which we would here assign the title "logical" undoubtedly include all that can supply the place of the older metaphysic, but in aim and method are so distinct that the same title cannot be borne by both. To assign so extensive a range to logical investigations enables us to see that the criteria by which at one time or another a narrower province was determined for logic are but partial expressions of the whole truth. The analysis of knowledge as such, the complete theory of the intelligible elements in conscious experience, does hold a special relation to all other subordinate branches of human thinking, whether philosophic in the ordinary sense of that term or scientific. According as one or other aspect of this relation is made prominent, there comes forward one or other of the various modes for settling the province of logic; but these partial conceptions prove their inadequacy when development is attempted from them, and within the systems constructed in accordance with them there is of necessity continuous reference to inquiries lying beyond the prescribed limits.

A certain analysis of some methods of ordinary thinking, based to a very large extent on language, and resembling in many respects grammatical study, has long been current in educational practice as logic; and to those whose con-

ception of the subject has been formed from acquaintance with this imperfect body of rules and formulæ it may appear a violent and unnecessary extension of the term to apply it to the all-comprehensive theory of knowledge. The reasons, however, are imperative; and, as these would lead one to deny the right of this elementary practical discipline to the possession of the title, it is desirable to conclude by offering a single remark on the place and function of this currently designated logic.

Not much trouble is required in order to see that the ordinary school or formal logic can lay no claim to scientific completeness. Its principles are imperfect, dubious, and most variously conceived; it possesses no method by which development from these principles is possible; it has no criterion by which to test the adequacy of its abstract forms as representations of the laws of concrete thinking. Accordingly it is handled, in whole and in detail, in the most distractingly various fashion, and, were it indeed entitled to the honourable designation of logic, the prospects of that science might well be despaired of. But in fact the school logic discharges a function for which exhaustiveness of logical analysis is not a requisite. It has a *raison d'être* in the circumstance that training to abstract methods must needs be a graduated process, and that, whether as a means towards the prosecution of philosophic study in especial, or as instrument of general educational value, practice in dealing with abstract thoughts must have value. Such elementary practice naturally bases itself on the kinds of distinction apparent in the concrete thinking of those to whom it is applied; and for this reason school logic not only connects itself with and is in a sense the development of grammar and grammatical analysis and synthesis, but

may, to a limited extent, include reference to some of the simpler processes of scientific method. In all probability the discord observable among the ordinary treatises on school logic is due to the want of recognition of the true place which can thus be assigned to the subject treated. The doctrine has a propædeutic but not a scientific value.

Note A

HISTORIES OF LOGIC

No complete history of logic, apart from philosophy in general, exists; and there can be no doubt that any such history, as far at least as modern logic is concerned, must be more or less a historical review of the main philosophical systems and of the influence they have respectively exercised on logical study. But of the Aristotelian logic, in its system and in its development throughout the ancient and mediæval epochs, we possess a most adequate history. Prantl's great work (*Geschichte der Logik im Abendlande*, i., 1855; ii., 1861; iii., 1867; iv., 1870), extending to the close of the mediæval period, is a masterpiece of learned industry and skilled exposition.

The following are some of the more important contributions towards a history of logic, whether in independent works or in portions of systematic treatises; most of them, indeed, of small value: Ramus, *Scholæ Dialecticæ*, bk. i. chaps. 1-8; Keckermann, *Systema Logicæ*, 1598; Gassendi, *Opera*, i. 35-66; Fabricius, *Specimen elenchicum historiæ logicæ*, 1699; Walch, *Parerga Academica* (1721), pp. 453-848; Darjes, *Via ad Veritatem*, appendix, 1755; Buhle, in *Commentat. Soc. Gotting.*, vol. x.; Fülleborn, *Beiträge z. Gesch. d. Phil.* (1794), pt. iv. pp. 160-80; Eberstein, *Gesch. d. Logik u. Metaphysik bei den Deutschen von Leibnitz bis auf gegenwärtige Zeit* (2nd ed., 1794), useful as a survey of the Wolffian logics; Calker, *Denklehre* (1822), pp. 12-198; Bachmann, *System der Logik* (1828), pp. 569-644; Mussmann, *De Logicæ ac Dialecticæ notione historica*, 1828;

Troxler, *Logik* (1830), vol. ii.; Sigwart, *De historia logicæ inter Græcos usque ad Socratem*, 1832; St Hilaire, *De la Logique d'Aristote* (1838), ii. pp. 93-312; Franck, *Esquisse d'une histoire de la logique*, 1838; Reiffenberg, *Principes de logique*, 1833 (with bibliography); Trendelenburg, *Gesch. d. Kategorienlehre*, 1846; Blakey, *History of Logic*, and *Essay on Logic* (2nd ed., 1848), with bibliographical appendix; Hoffmann, *Grundzüge einer Geschichte der Begriff der Logik in Deutschland von Kant bis Baader*, 1851; K. Fischer, *Logik u. Metaphysik* (2nd ed., 1865), pp. 16-182, a valuable critique of some modern doctrines; Rabus, *Logik und Metaphysik* (1868), i. pp. 123-242, excellent; Ueberweg, *System der Logik* (4th ed., 1874), pp. 15-66, excellent critical account; Ragnisco, *Storia critica delle Kategorie*, 1871, 2 vols.; Rabus, *Die neuesten Bestrebungen auf dem Gebiete der Logik bei den Deutschen*, 1880; Harms, *Geschichte der Logik*, 1881; Venn, *Symbolic Logic*, 1881 (introduction, and pp. 405-444), a valuable contribution to the history and bibliography of the application of symbolic methods in logic. The only good bibliography of logic is that given by Rabus in his *Logik u. Metaphysik*, i. pp. 453-518. Some of the older lexicons, *e.g.*, Lipenius, *Bibliotheca Realis* (1685), *s. vv.* "Logica," "Organon," "Dialectica," contain great store of bibliographical references. A complete bibliography is a desideratum.

Note B

HINDU SYSTEMS OF LOGIC

In almost all the Hindu systems of philosophy, as these are classified by the most recent authorities, indications are to be found of a more or less developed analysis of the process or method of reasoning, and therefore of a certain amount of logical theory. In two systems in particular the logical element is the most prominent feature. The *Nyâya*, or logical doctrine of Gotama, is in a very special sense the Hindu logic, while in the *Vaiseschika*, or Atomist system of

Kanada, there are many expansions of or additions to the *Nyâya*, though the prevailing interest is not logical.

The most accessible sources of information regarding the Hindu logic, Colebrooke's *Essays*, and Professor M. Müller's abstract (in the appendix to Archbishop Thomson's *Laws of Thought*), tend to mingle in an undesirable fashion what is special to the Nyâya doctrine, and what is added by Kanada and his followers. In order to appreciate the extent to which the analysis of reasoning has been carried in these early systems, it is advisable to restrict attention to the original exposition of the *Nyâya*.

The aim of Nyâya is the attainment of perfection, of bliss, through knowledge. But, to have knowledge in a systematic and complete fashion, it is requisite that the individual should know (or should be capable of organising his knowledge in reference to) the sixteen great topics or heads of discussion. These, as enumerated by Gotama, are—(1) proof; (2) the objects of proof; (3) doubt; (4) motive; (5) the illustration or example for discussion; (6) the final assertion; (7) the enumeration of the five members of the final assertion; (8) confirmatory argument; (9) the conclusion, the defined judgment; (10) the objection; (11) controversy; (12) deceptive counter argument; (13) apparent reason or sophism; (14) fraud or wilfully deceptive argument, ruse; (15) futile argument or self-contradictory counter argument; (16) conclusive refutation. Inspection of these at once shows that they represent stages in dialectic or in the process of clearing up knowledge by discussion.

The generalia, *i.e.*, the kinds of proof, described as four in number—sense-perception, inference (either from cause to effect, from effect to cause, or from community of nature, *i.e.*, in a wide sense, analogy), comparison (analogy in a stricter significance), tradition—and the things about which proof may be exercised, under which a twelvefold division is given by Gotama, and enlarged in endless detail by his commentators, who introduce thereunder much of Kanada's system, are first laid down as the basis for the whole. Then follows (Nos. 3-6) the progress from doubt, which first calls for reasoning or proof, through motive, to position of the problem in the form of an example or case, and to the general assertion, as having valid grounds.

The analysis of the grounds of assertion is then given, and here we have what corresponds more particularly to the syllogism as known to us. Five members are signalised: (1) the thesis or proposition to be proved; (2) the reason, or intermediate ground by which the subject of the proposition is linked on to an explanatory principle; (3) the explanatory principle; (4) the application of this explanatory principle; (5) the statement of the conclusion as following from the application. Thus, in the example usually given—(1) *thesis*, this mountain is fiery; (2) *intermediate ground*, because it smokes; (3) *explanatory principle*, whatever smokes is fiery, as, for instance, a hearth; (4) *application*, therefore this mountain is fiery; (5) *statement of conclusion*, the mountain, then, is fiery, because it smokes. There can be no doubt that in this somewhat unsystematic arrangement we have the outlines of syllogistic argument. Considerable obscurity, however, rests over the third member, and it is only partially cleared up when we proceed to the next topic, which may perhaps be translated confirmatory argument. Here the essence of the argument appears to be a regress from the known mark to the fundamental quality from which it follows. Thus, *e.g.*, if it were said *the mountain is not fiery*, then the argument would be adduced, but *the mountain smokes*, and what is not fiery does not smoke. Apparently there is involved the assumption that the mark is a necessary consequence of the primary quality, but the exposition is obscure, and, doubtless, connects itself with the principles of causal connection recognised by Hindu thinkers. (See Williams, as below, pp. 73-4).

When the conclusion has thus been confirmed, when the negation of the ground has been shown to fail in explaining the observed fact, the thesis may be stated in an absolute and definitive form (topic 9). The remaining seven topics are then concerned with the discussion which may arise when an opponent brings forward objections to the conclusion. This he must do by positing his antithesis (10), whereupon issue may be joined (11). Should the adversary be unable to establish his antithesis, he may resort to deceit, bringing forward arguments, illogically arranged and devoid of force (12), which soon leads to the employment of sophisms (13) or merely apparent arguments, and even to

deceitful ruses (14). Under these topics the *Nyâya* signalises and discusses various well-known forms of fallacy. The destruction of all these fallacious arguments reduces the opponent to the employment of futile, irrelevant responses, which undermine his own position (15), and the exposure of which completes his discomfiture and reduces him to silence (16).

Expositions of this dialectic system are not yet available in such kind and amount as would enable one to do full justice to it. Evidently much patience and a very considerable knowledge of the current philosophical view would be requisite in order to appreciate at their true worth many apparently formal, and in some cases dubious, divisions. Of accounts which may be consulted the following seem the more important: Colebrooke's *Essays on the Religion and Philosophy of the Hindus*, from which the expositions in Ritter (*Ges. d. Phil.*, iv. 382 *sq.*), Hegel (*Werke*, xiii. 161-167), and Cousin (*Histoire Générale*, Leçon ii.) are taken; Ward's *Account of the History, Literature, and Religion of the Hindoos* (4 vols., 1811; later editions, with title altered, in 1815, 1817, 1821); Windischmann, *Philosophie im Fortgange der Weltgeschichte* (1834), specially pp. 1895-1920; M. Müller, appendix to Thomson's *Laws of Thought;* Rozenkranz, *Die Modificationen der Logik* (1846), pp. 184-97. Williams, *Indian Wisdom*, pp. 71-88; St Hilaire, articles "Indiens," "Gotama," "Nyâya," "Kanada," in the *Dictionnaire Philosophique*, and translation, with commentary, of part of Gotama's "Sûtras," in the *Mémoires de l'Académie des Sciences Morales et Politiques*, tom. iii.

Note C

RAMUS

The logical theories of Ramus acquired for a brief period a factitious importance from their connection with the general revolt against Aristotelianism, and with the Protestant struggle against the Roman Catholic authority.

In themselves they have no particular value, nor indeed much originality, and the exposition of them by their author, always rather literary than philosophic, adds nothing of strength or interest. In comparison with the Aristotelian analysis of the forms and methods of thinking, the few alterations of statement, and generally the thin residuum of logical theory, which characterise Ramist work, appear as singularly insignificant. Nor have any of the special peculiarities of the Ramist logic exercised influence on the history of logical doctrines. The keenness of the controversy which raged in so many of the centres of learning between the Aristotelians and the total or partial Ramists is explicable only as having reference to differences which were merely symbolised by the apparent difference in logical doctrine.

In the Protestant universities and seminaries generally the Ramist logic obtained, and for some time kept, a firm footing. In Scotland, through Melville, Buchanan, and the Earl of Murray, who had been a pupil of Ramus, his system was installed as the orthodox staple of logical training, and such records as remain of Scottish university education during the troubled sixteenth century would undoubtedly exhibit the traces of this new movement. In England, Cambridge alone, always disposed to reject the authority of Aristotle, and generally more open to new ideas than the sister university, was a stronghold of Ramism, and, apart from special works of Ramist tendency, the influence of the new doctrine is discernible in the writings of more than one Cambridge alumnus. William Temple, a friend of Sir Philip Sidney, and an official of the university, published a volume of *Scholia in Rami Dialecticam*, 1591; George Downam, prælector on logic, wrote commentaries *In Petri Rami Dialecticam*, 1606; and Milton, in 1672, expanded the *Dialectica* in his *Artis Logicæ Plenior Institutio*. Marlowe's *Faustus*, and his *Massacre of St Bartholomew*, show how familiar Ramist phraseology and the personality of Ramus must have been to an alumnus of Cambridge, while Bacon, with well-grounded objection to much of the Ramist method, expounds the system of logic with unmistakable reference to the Ramist principles and method of arrangement. There is a monograph on Ramus by Ch. Waddington

with a good bibliography—*Ramus (Pierre de la Ramée): sa Vie, ses Écrits, et ses Opinions*, Paris, 1856—and a slighter work, mainly biographical, by Ch. Desmaze (*P. Ramus, Professeur au Collége de France: sa Vie, ses Écrits, sa Mort*, 1515-72, Paris, 1864). In Lipenius (*Bibliotheca Realis, s.v.* "Ramus") will be found a long list of writings for and against the Ramist logic. The history of the movement is also given in Buhle (*Gesch. d. neuern Phil.*, ii. 680-702), Tennemann (*Gesch. d. Phil.*, ix. pp. 420-42), Du Boulay (*Hist. Univer. Paris*, tom. iv.), Crevier (*Hist. de l'Univ. de Paris*, vol. v.), in Jo. Hermannus ab Elswich (*Schediasma de varia Aristotelis in scholis Protestantium fortuna*, §§ 21-29), De Launoy (*De Varia Aristot. in Acad. Paris. fortuna*, cap. xiii.), and in Bayle (*Dictionnaire, s.v.* "Ramus").

SUPPLEMENTARY ARTICLES

I

CATEGORY

Category, a term first introduced into the philosophical vocabulary by Aristotle, means etymologically an accusation. Even in the writings of Aristotle the word occurs once or twice in this its primary acceptation, but generally it has there a definite and technical signification. So also in Aristotle the verb *κατηγορεῖν*, to accuse, takes the specific logical sense, to predicate; *τὸ κατηγορούμενον* becomes the predicate; and *κατηγορικὴ πρότασις* may be translated as affirmative proposition. But though the word thus received a new signification from Aristotle, it is not on that account certain that the thing it was taken to signify was equally a novelty in philosophy. We do find in the records of Oriental and early Greek thought something corresponding to the Aristotelian classification.

Our knowledge of Hindu philosophy, and of the relations in which it may have stood to Greek speculation, is not yet adequate to give decisive answers to various questions

that naturally arise on observation of their many resemblances; and it might therefore appear irrelevant to introduce into an historical notice of a peculiarly Western doctrine any reference to its Eastern counterpart. Yet the similarity between the two is so striking that, if not historically connected, they must at least be regarded as expressions of similar philosophic wants. The Hindu classification to which we specially refer is that of Kanada, who lays down six categories, or classes of existence, a seventh being generally added by the commentators. The term employed is Padârtha, meaning "signification of a word." This is in entire harmony with the Aristotelian doctrine, the categories of which may with truth be described as significations of simple terms, *τὰ κατὰ μηδεμίαν συμπλοκὴν λεγόμενα*. The six categories of Kanada are Substance, Quality, Action, Genus, Individuality, and Concretion or Co-inherence. To these is added Non-Existence, Privation, or Negation. *Substance* is the permanent sub-strate in which *Qualities* exist. *Action*, belonging to or inhering in substances, is that which produces change. *Genus* belongs to substance, qualities, and actions; there are higher and lower genera. *Individuality*, found only in substance, is that by which a thing is self-existent and marked off from others. *Concretion* or Co-inherence denotes inseparable or necessary connection, such as that between substance and quality. Under these six classes, *γένη τοῦ ὄντος*, Kanada then proceeds to range the facts of the universe.[1]

Within Greek philosophy itself there were foreshadow-

[1] For details of this and other Hindu systems see Colebrooke, *Essays;* H. H. Wilson, *Essays;* Williams, *Indian Wisdom;* Gough's *Vaiseshika-Sutras;* M. Müller, *Sanskrit Literature*, and particularly his Appendix to Thomson's *Laws of Thought.*

ings of the Aristotelian doctrine, but nothing so important as to warrant the conclusion that Aristotle was directly influenced by it. Doubtless the One and Many, Being and Non-Being, of the Eleatic dialectic, with their subordinate oppositions, may be called categories, but they are not so in the Aristotelian sense, and have little or nothing in common with the later system. Their starting-point and results are wholly diverse. Nor does it appear necessary to do more than mention the Pythagorean table of principles, the number of which is supposed to have given rise to the decuple arrangement adopted by Aristotle. The two classifications have nothing in common; no term in the one list appears in the other; and there is absolutely nothing in the Pythagorean principles which could have led to the theory of the categories.[1]

One naturally turns to Plato when endeavouring to discover the genesis of any Aristotelian doctrine, and undoubtedly there are in the Platonic writings many detached discussions in which the matter of the categories is touched upon. Special terms also are anticipated at various times, *e.g.*, ποιότης in the *Theætetus*, ποιεῖν and πάσχειν in the *Gorgias*, and πρός τι in the *Sophist*.[2] But there does not seem to be anything in Plato which one could say gave occasion directly and of itself to the Aristotelian doctrine; and, even when we take a more comprehensive view of the Platonic system and inquire what in it corresponds to the widest definition of categories, say as ultimate elements of thought and existence, we receive no very definite answer.

[1] The supposed origin of that theory in the treatise περὶ τοῦ παντός, ascribed to Archytas (c. 428-347 B.C.), has been proved to be an error. The treatise itself dates in all probability from the Neo-Pythagorean schools of the second century A.D.

[2] Prantl, *Ges. d. Logik*, i. 74-75; Trendelenburg, *Kategorienlehre*, 209, *n.*

The Platonic dialectic never worked out into system, and only in two dialogues do we get anything like a list of ultimate or root-notions. In the *Sophist*, Being, Rest, and Motion (*τὸ ὂν αὐτὸ καὶ στάσις καὶ κίνησις*) are laid down as *μέγιστα τῶν γενῶν*.[1] To these are presently added the Same and the Other (*ταὐτὸν καὶ θάτερον*), and out of the consideration of all five some light is cast upon the obscure notion of Non-Being (*τὸ μὴ ὄν*). In the same dialogue (262, *sq.*) is found the important distinction of *ὄνομα* and *ῥῆμα*, noun and verb. The *Philebus* presents us with a totally distinct classification into four elements—the Infinite, the Finite, the Mixture or Unity of both, and the Cause of this unity (*τὸ ἄπειρον, τὸ πέρας, ἡ σύμμιξις, ἡ αἰτία*). It is at once apparent that, however these classifications are related to one another and to the Platonic system, they lie in a different field from that occupied by the Aristotelian categories, and can hardly be said to have anything in common with them.

The Aristotelian doctrine is most distinctly formulated in the short treatise *Categoriæ*, which generally occupies the first place among the books of the *Organon*. The authenticity of the treatise was doubted in early times by some of the commentators, and the doubts have been revived by such scholars as Spengel and Prantl. On the other hand, Brandis, Bonitz, and Zeller are of opinion that the tract is substantially Aristotle's. The matter is hardly one that can be decided either *pro* or *con* with anything like certainty; but this is of little moment, for the doctrine of the categories, even of the *ten* categories, does not stand or fall with only one portion of Aristotle's works.

It is surprising that there should yet be so much uncertainty as to the real significance of the categories, and that

[1] *Soph.*, 254, D.

we should be in nearly complete ignorance as to the process of thought by which Aristotle was led to the doctrine. On both points it is difficult to extract from the matter before us anything approaching a satisfactory solution. The terms employed to denote the categories have been scrutinised with the utmost care, but they give little help. The most important—*κατηγορίαι τοῦ ὄντος* or *τῆς οὐσίας*, *γένη τοῦ ὄντος* or *τῶν ὄντων*, *γένη* simply, *τὰ πρῶτα* or *τὰ κοινὰ πρῶτα*, *αἱ πτώσεις*, or *αἱ διαιρέσεις*—only indicate that the categories are general classes into which Being as such may be divided, that they are *summa genera*. The expressions *γένη τῶν κατηγορίων* and *σχήματα τῶν κατηγορίων*, which are used frequently, seem to lead to another and somewhat different view. *Κατηγορία* being taken to mean that which is predicated, *γένη τῶν κατηγορίων* would signify the most general classes of predicates, the framework into the divisions of which all predicates must come. To this interpretation there are objections. The categories must be carefully distinguished from predicables; in the scholastic phraseology the former refer to *first intentions*, the latter to *second intentions*—*i.e.*, the one denote real, the other logical connection. Further, the categories cannot without careful explanation be defined as predicates; they are this and something more. The most important category, *οὐσία*, in one of its aspects cannot be predicate at all.

In the *Categoriæ* Aristotle prefixes to his enumeration a grammatico-logical disquisition on homonyms and synonyms, and on the elements of the proposition, *i.e.*, subject and predicate. He draws attention to the fact that things are spoken of either in the connection known as the proposition, *e.g.*, "a man runs," or apart from such connection, *e.g.*, "man" and "runs." He then proceeds, "Of things spoken of apart from their connection in a proposition (*τῶν*

κατὰ μηδεμίαν συμπλοκὴν λεγομένων), each signifies either Substance (οὐσία), or Quantity (ποσόν), or Quality (ποιόν), or Relation (πρός τι), or Where (*i.e.*, Place, ποῦ), or When (*i.e.*, Time, ποτέ), or Position (κεῖσθαι), or Possession (ἔχειν), or Action (ποιεῖν), or Passion (πάσχειν). Οὐσία, the first category, is subdivided into πρώτη οὐσία or primary substance, which is defined to be τόδε τι, the singular thing in which properties inhere, and to which predicates are attached, and δεύτεραι οὐσίαι, genera or species which can be predicated of primary substances, and are therefore οὐσία only in a secondary sense. Nevertheless, they too, after a certain fashion, signify the singular thing, τόδε τι (*Categ.*, p. 3b 12, 13). It is this doctrine of πρώτη οὐσία that has raised doubts with regard to the authenticity of the *Categoriæ*. But the tenfold classification, which has also been captiously objected to, is given in an acknowledged writing of Aristotle's (see *Topica*, i. 9, p. 103b 20).[1] At the same time it is at least remarkable that in two places where the enumeration seems intended to be complete (*Met.*, p. 1017a 25 ; *An. Pos.*, i. 22, p. 83a 21), only eight are mentioned, ἔχειν and κεῖσθαι being omitted. In other passages[2] six, five, four, and three are given, frequently with some addition, such as καὶ αἱ ἄλλαι κατηγορίαι. It is also to be observed that, despite of this wavering, distinct intimations are given by Aristotle that he regarded his list as complete, and he uses phrases which would seem to indicate that the division had been exhaustively carried out. He admits certainly that some predicates which come under one category might be referred to another, but he declines to deduce

[1] Against this passage even the cross-grained Prantl can raise no objection of any moment ; see *Ges. der Logik*, i. 206, *n.*

[2] See Bonitz, *Index Aristotelicus*, *s.v.*, and Prantl, *Ges. d. Log.*, i. 207.

all from one highest class, or to recognise any relation of subordination among the several classes.

The full import of the categories will never be adequately reached from the point of view taken up in the *Categoriæ*, which bears all the marks of an early and preliminary study. For true understanding we must turn to the *Metaphysics*, where the doctrine is handled at large. The discussion of Being in that work starts with a distinction that at once gives us a clue. Τὸ ὄν is spoken of in many ways; of these four are classified—τὸ ὂν κατὰ συμβεβηκός, τὸ ὂν ὡς ἀληθές, τὸ ὂν δυνάμει καὶ ἐνεργείᾳ, and τὸ ὂν κατὰ τὰ σχηματὰ τῶν κατηγορίων. It is evident from this that the categories can be regarded neither as purely logical nor as purely metaphysical elements. They indicate the general forms or ways in which Being can be predicated; they are determinations of Being regarded as an object of thought, and consequently as matter of speech. It becomes apparent also why the analysis of the categories starts from the singular thing, for it is the primary form under which all that is becomes object of knowledge, and the other categories modify or qualify this real individual. Πάντα δὲ τὰ γιγνόμενα ὑπό τέ τινος γίγνεται καὶ ἔκ τινος καὶ τί. Τὸ δὲ τί λέγω καθ' ἑκάστην κατηγορίαν· ἢ γὰρ τόδε ἢ ποσὸν ἢ ποιὸν ἢ ποῦ (*Met.*, p. 1032a 13-15). . . . The categories, therefore, are not logical forms but real predicates; they are the general modes in which Being may be expressed. The definite thing, that which comes forward in the process from potentiality to full actuality, can only appear and be spoken of under forms of individuality, quality, quantity, and so on. The nine later categories all denote entity in a certain imperfect fashion.

The categories then are not to be regarded as heads of predicates, the framework into which predicates can be

thrown. They are real determinations of Being—*allgemeine Bestimmtheiten*, as Hegel calls them. They are not *summa genera* of existences, still less are they to be explained as a classification of nameable things in general. The objections Mill has taken to the list are entirely irrelevant, and would only have significance if the categories were really—what they are not—an exhaustive division of concrete existences. Grote's view (*Aristotle*, i. 108) that Aristotle drew up his list by examining various popular propositions, and throwing the different predicates into genera, "according as they stood in different logical relation to the subject," has no foundation. The relation of the predicate category to the subject is not entirely a logical one; it is a relation of real existence, and wants the essential marks of the propositional form. The logical relations of τὸ ὄν are provided for otherwise than by the categories.

Aristotle has given no intimation of the course of thought by which he was led to his tenfold arrangement, and it seems hopeless to discover it. Trendelenburg in various essays has worked out the idea that the root of the matter is to be found in grammatical considerations, that the categories originated from investigations into grammatical functions, and that a correspondence will be found to obtain between categories and parts of speech. Thus, Substance corresponds to noun substantive, Quantity and Quality to the adjective, Relation partly to the comparative degree and perhaps to the preposition, When and Where to the adverbs of time and place, Action to the active, Passion to the passive of the verb, Position (κεῖσθαι) to the intransitive verb, ἔχειν to the peculiar Greek perfect. That there should be a very close correspondence between the categories and grammatical elements is by no means surprising; that the one were deduced from the other is

both philosophically and historically improbable. Reference to the detailed criticisms of Trendelenburg by Ritter, Bonitz, and Zeller will be sufficient.

Aristotle has also left us in doubt on another point. Why should there be only *ten* categories? and why should these be the ten? Kant and Hegel, it is well known, signalise as the great defect in the Aristotelian categories the want of a principle, and yet some of Aristotle's expressions would warrant the inference that he *had* a principle, and that he thought his arrangement exhaustive. The leading idea of all later attempts at reduction to unity of principle, the division into substance and accident, was undoubtedly not overlooked by Aristotle, and Brentano has collected with great diligence passages which indicate how the complete list might have been deduced from this primary distinction. His tabular arrangements (pp. 175, 177) are particularly deserving of attention. The results, however, are hardly beyond the reach of doubt.

There was no fundamental change in the doctrine of the categories from the time of Aristotle to that of Kant, and only two proposed re-classifications are of such importance as to require notice. The Stoics adopted a fivefold arrangement of highest classes, *γενικώτατα*. Τὸ *ὄν* or *τί*, Being, or somewhat in general, was subdivided into *ὑποκείμενα* or subjects, *ποιά* or qualities in general, which give definiteness to the blank subject, *πῶς ἔχοντα*, modes which further determine the subject, and *πρός τι πῶς ἔχοντα*, definite relative modes. These categories are so related that each involves the existence of one higher than itself, thus there cannot be a *πρός τι πῶς ἔχον* which does not rest upon or imply a *πῶς ἔχον*, but *πῶς ἔχον* is impossible with-

[1] Brentano, *Bedeutung des Seienden nach Aristoteles*, pp. 148-178.

out ποιόν, which only exists in ὑποκείμενον, a form or phase of τὸ ὄν.[1]

Plotinus, after a lengthy critique of Aristotle's categories, sets out a twofold list. Τὸ ἕν, κίνησις, στάσις, ταὐτότης, ἑτερότης are the primitive categories (πρῶτα γένη) of the intelligible sphere. Οὐσία, πρός τι, ποιά, ποσόν, κίνησις are the categories of the sensible world. The return to the Platonic classification will not escape notice.

Modern philosophy, neglecting altogether the dry and tasteless treatment of the Aristotelian doctrine by scholastic writers, gave a new, a wider, and deeper meaning to the categories. They now appear as ultimate or root notions, the metaphysical or thought elements, which give coherence and consistency to the material of knowledge, the necessary and universal relations which obtain among the particulars of experience. There was thus to some extent a return to Platonism; but in reality, as might easily be shown, the new interpretation was, with due allowance for difference in point of view, in strict harmony with the true doctrine of Aristotle. The modern theory dates in particular from the time of Kant, who may be said to have reintroduced the term into philosophy. Naturally there are some anticipations in earlier thinkers. The Substance, Attribute, and Mode of Cartesianism can hardly be classed among the categories; nor does Leibniz's chance suggestion of a fivefold arrangement into Substance, Quantity, Quality, Action and Passion, and Relations, demand any particular notice. Locke, too, has a classification into Substances, Modes, and Relations, but in it he has manifestly no intention of drawing up a table of categories. What in his system

[1] For detailed examination of the Stoic categories, see Prantl, *Ges. d. Logik*, i. 428, *sqq.*; Zeller, *Ph. d. Gri.*, iii. 1, 82, *sqq.*; Trendelenburg, *Kateg.*, p. 217.

corresponds most nearly to the modern view of these elements is the division of kinds of real predication. In all judgments of knowledge we predicate either (1) Identity or Diversity, (2) Relation, (3) Coexistence, or necessary connection, or (4) Real existence. From this the transition was easy to Hume's important classification of *philosophical relations* into those of Resemblance, Identity, Time and Place, Quantity or Number, Quality, Contrariety, Cause and Effect.

These attempts at an exhaustive distribution of the necessary relations of all objects of knowledge indicate the direction taken by modern thought, before it received its complete expression from Kant.

The doctrine of the categories is the very kernel of the Kantian system, and, through it, of later German philosophy. To explain it fully would be to write the history of that philosophy. The categories are called by Kant root-notions of the understanding (*Stammbegriffe des Verstandes*), and are briefly the specific forms of the *a priori* or formal element in rational cognition. It is this distinction of matter and form in knowledge that marks off the Kantian from the Aristotelian doctrine. To Kant knowledge was only possible as the synthesis of the material or *a posteriori* with the formal or *a priori*. The material to which *a priori* forms of the understanding were applied was the sensuous content of the pure intuitions, time and space. This content could not be *known* by sense, but only by intellectual function. But the understanding in the process of knowledge makes use of the universal form of synthesis, the judgment; intellectual function is essentially of the nature of judgment or the reduction of a manifold to unity through a conception. The specific or type forms of such function will, therefore, be expressed in

judgments; and a complete classification of the forms of judgments is the key by which one may hope to discover the system of categories. Such a list of judgments Kant thought he found in ordinary logic, and from it he drew up his well-known scheme of the twelve categories. These forms are the determinations of all objects of experience, for it is only through them that the manifold of sense can be reduced to the unity of consciousness, and thereby constituted experience. They are *a priori* conditions, subjective in one sense, but objective as being universal, necessary, and constitutive of experience.

The table of logical judgments with corresponding categories is as follows:—

Judgments.		Categories.
Universal ...	I. Of Quantity	Unity.
Particular ...		Plurality.
Singular		Totality.
Affirmative ...	II. Of Quality	Reality.
Negative		Negation.
Infinite		Limitation.
Categorical ...	III. Of Relation	Inherence and Subsistence (Substance and Accident).
Hypothetical		Causality and Dependence (Cause and Effect).
Disjunctive...		Community (Reciprocity).
Problematical	IV. Of Modality	Possibility and Impossibility.
Assertoric ...		Existence and Non-Existence.
Apodictic ...		Necessity and Contingency.

Kant, it is well known, criticises Aristotle severely for having drawn up his categories without a principle, and claims to have disclosed the only possible method by which an exhaustive classification might be obtained. What he criticised in Aristotle is brought against his own procedure by the later German thinkers, particularly Fichte and Hegel. And in point of fact it cannot be denied that Kant has allowed too much completeness to the ordinary logical dis-

tribution of propositions; he has given no proof that in these forms are contained all species of synthesis, and in consequence he has failed to show that in the categories, or pure conceptions, are contained all the modes of *a priori* synthesis. Further, his principle has so far the unity he claimed for it, the unity of a single function, but the specific forms in which such unity manifests itself are not themselves accounted for by this principle. Kant himself hints more than once at the possibility of a completely rational system of the categories, at an evolution from one single movement of thought, and in his *Remarks on the Table of the Categories* gave a pregnant hint as to the method to be employed. From any complete realisation of this suggestion Kant, however, was precluded by one portion of his theory. The categories, although the necessary conditions under which alone an object of experience can be thrown, are merely forms of the mind's own activity; they apply only to sensuous and consequently subjective material. Outside of and beyond them lies the thing-in-itself, the blankest and emptiest of abstractions, which yet to Kant represented the ultimately real.

This subjectivism was a distinct hiatus in the Kantian system, and against it principally Fichte and Hegel directed criticism. It was manifest that at the root of the whole system of categories there lay the synthetising unity of self-consciousness, and it was upon this unity that Fichte fixed as giving the possibility of a more complete and rigorous deduction of the pure notions of the understanding. Without the act of the Ego, whereby it is self-conscious, there could be no knowledge, and this primitive act or function must be, he saw, the *position* or affirmation of itself by the Ego. The first principle then must be that the Ego posits itself as the Ego, that the Ego = Ego, a principle which is un-

conditioned both in form and matter, and therefore capable of standing absolutely first, of being the *prius* in a system. Metaphysically regarded this act of self-position yields the categories of Reality. But, so far as matter is concerned, there cannot be affirmation without negation, *omnis determinatio est negatio.* The determination of the Ego presupposes or involves the Non-Ego. The form of the proposition in which this second act takes to itself expression, the Ego is not = Not-Ego, is unconditioned, not derivable from the first. It is the absolute antithesis to the primitive thesis. The category of Negation is the result of this second act. From these two propositions, involving absolutely opposed and mutually destructive elements, there results a third which reconciles both in a higher synthesis. The notion in this third is determination or limitation; the Ego and Non-Ego limit, and are opposed to, one another. From these three positions Fichte proceeds to evolve the categories by a series of thesis, antithesis, and synthesis.

In thus seizing upon the unity of self-consciousness as the origin for systematic development, Fichte has clearly taken a step in advance of, and yet in strict harmony with, the Kantian doctrine. For, after all that can be said as to the demonstrated character of formal logic, Kant's procedure was empirical, and only after the list of categories had been drawn out, did he bring forward into prominence what gave them coherence and reality. The peculiar method of Fichte, also, was nothing but a consistent application of Kant's own *Remark on the Table of the Categories.* Fichte's doctrine, however, is open to some of the objections advanced against Kant. His method is too abstract and external, and wants the unity of a single principle. The first two of his fundamental propositions stand isolated

from one another, not to be resolved into a primitive unity. With him, too, the whole stands yet on the plane of subjectivity. He speaks, indeed, of the universal Ego as distinct from the empirical self-consciousness; but the universal does not rise with him to concrete spirit. Nevertheless the *Wissenschaftslehre* contains the only real advance in the treatment of the categories from the time of Kant to that of Hegel.[1] This, of course, does not imply that there were not certain elements in Schelling, particularly in the *Transcendental Idealism*, that are of value in the transition to the later system; but on the whole it is only in Hegel that the whole matter of the Kantian categories has been assimilated and carried to a higher stage.

The Hegelian philosophy, in brief, is a system of the categories; and, as it is not intended here to expound that philosophy, it is impossible to give more than a few general and quite external observations as to the Hegelian mode of viewing these elements of thought. With Kant, as has been seen, the categories were still subjective, not as being forms of the individual subject, but as having over against them the world of *noumena* to which they were inapplicable. Self-consciousness, which was, even with Kant, the *nodus* or kernel whence the categories sprang, was nothing but a logical centre,—the reality was concealed.

[1] It does not seem necessary to do more than refer to the slight alterations made on Kant's Table of Categories by Herder (in the *Metakritik*), by Maimon in the *Propadeutik zu einer neuen Theorie des Denkens*), by Fries (in the *Neue Kritik der Vernunft*), or by Schopenhauer, who desired to reduce all the categories to one—that of Causality. We should require a new philosophical vocabulary even to translate the extraordinary compounds in which Krause expounds his theory of the categories. Notices of the changes introduced by Rosmini, and of Gioberti's remarkable theory, will be found in Ragnisco's work referred to below.

There was thus a dualism, to overcome which is the first step in the Hegelian system. The principle, if there is to be one, must be universally applicable, all-comprehensive. Self-consciousness is precisely the principle wanted; it is a unity, an identity, containing in itself a multiplicity. The universal in absolute self-consciousness is just pure thinking, which in systematic evolution is the categories; the particular is the natural or multiform, the external as such; the concrete of both is spirit, or self-consciousness come to itself. The same law that obtains among the categories is found adequate to an explanation of the external thing which had so sadly troubled Kant. The categories themselves are moments of the universal of thought, type forms, or definite aspects which thought assumes; determinations, *Bestimmungen*, as Hegel most frequently calls them. They evolve by the same law that was found to be the essence of ultimate reality—*i.e.*, of self-consciousness. The complete system is pure thought, the Universal *par excellence*.

After the Hegelian there can hardly be said to have been a philosophical treatment of the categories in Germany, which is not more or less a criticism of that system. It does not seem necessary to mention the unimportant modifications introduced by Kuno Fischer, Erdmann, or others belonging to the school. In the strongly-opposed philosophy of Herbart, the categories can hardly be said to hold a prominent place. They are, with him, the most general notions which are psychologically formed, and he classifies them as follows: (1) Thing, either as product of thought, or as given in experience; (2) Property, either qualitative or quantitative; (3) Relation; (4) The Negated. Along with these, he posits as categories of inner process—(1) Sensation, (2) Cognition, (3) Will, (4) Action. George,[1]

[1] *Lehrbuch der Metaphysik*, 1844.

who in the main follows Schleiermacher, draws out a table of categories which shows, in some points, traces of Herbartian influence. His arrangement by enneads, or series of nine, is fanciful, and wanting in inner principle.

The most imposing recent attempt at a reconstruction of the categories is that of Trendelenburg. To him the first principle, or primitive reality, is Motion, which is both real as external movement, and ideal as inner construction. The necessary conditions of Motion are Time and Space, which are both subjective and objective. From this point onwards are developed the mathematical (point, line, &c.) and real (causality, substance, quantity, quality, &c.) categories which appear as involved in the notion of motion. Matter cannot be regarded as a product of motion; it is the condition of motion; we must think something moved. All these categories, "under the presupposition of motion as the first energy of thought, are ideal and subjective relations; as also, under the presupposition of motion as the first energy of being, real and objective relations."[1] A serious difficulty presents itself in the next category, that of End (*Zweck*), which can easily be thought for inner activity, but can hardly be reconciled with real motion. Trendelenburg solves the difficulty only empirically, by pointing to the insufficiency of the merely mechanical to account for the organic. The consideration of Modality effects the transition to the forms of logical thought. On the whole, Trendelenburg's unique fact of motion seems rather a blunder. There is much more involved than he is willing to allow, and motion *per se* is by no means adequate to self-consciousness. His theory has found little favour.

Ulrici works out a system of the categories from a psychological or logical point of view. To him the funda-

[1] *Logische Untersuchungen*, i. 376-7.

mental fact of philosophy is the distinguishing activity (*unterscheidende Thätigkeit*) of thought. Thought is only possible by distinction, difference. The fixed points in the relations of objects upon which this activity turns are the categories, which may be called the forms or laws of thoughts. They are the aspects of things, notions under which things must be brought, in order to become objects of thought. They are thus the most general predicates or heads of predicates. The categories cannot be completely gathered from experience, nor can they be evolved *a priori*; but, by attending to the general relations of thought and its purely indefinite matter, and examining what we must predicate in order to know being, we may attain to a satisfactory list. Such list is given in great detail in the *System der Logik* (1852), and in briefer, preciser form in the *Compendium der Logik* (2nd ed., 1872); it is in many points well deserving of attention.

The definition of the categories by the able French logician Renouvier, in some respects resembles that of Ulrici. To him the primitive fact is Relation, of which all the categories are but forms. "The categories," he says, "are the primary and irreducible laws of knowledge, the fundamental relations which determine its form and regulate its movements." His table and his criticism of the Kantian theory are both of interest.[1]

The criticism of Kant's categories by Cousin and his own attempted classification are of no importance. Of more interest to us, though not of much more value, is the elaborate table drawn out by Sir W. Hamilton.[2] The generalised category of the *Conditioned* has but little

[1] *Essais de Critique Generale*, 2nd ed.; *La Logique*, i. pp. 184, 190, 207-225.

[2] *Discussions*, p. 577.

meaning, and the subordinate categories evolve themselves by no principle, but are arranged after a formal and quite arbitrary manner. They are never brought into connection with thought itself, nor could they be shown to spring from its nature and relations.

J. S. Mill has presented, "as a substitute for the abortive classification of Existences, termed the categories of Aristotle," the following as an enumeration of all nameable things: (1) Feelings, or states of consciousness; (2) The minds which experience these feelings; (3) Bodies, or external objects which excite certain of those feelings; (4) Successions and coexistences, likenesses and unlikenesses, between feelings or states of consciousness.[1] This classification proceeds on a quite peculiar view of the categories, and is only presented here for the sake of completeness.

Trendelenburg, *Geschichte der Kategorienlehre*, 1846; Ragnisco, *Storia critica delle Categorie*, 2 vols. 1871. For Aristotle's doctrine the most important, in addition to Brandis, Zeller, and the above, are Bonitz, *Sitzungsber. d. kön. Akad. d. Wissen.*, Wien, 1853, pp. 591-645; Prantl, *Ges. d. Logik*, i.; and Brentano, *Bedeutung des Seienden nach Aristoteles*, 1862. See also Schuppe, *Die Kategorien des Aristoteles*, 1866; Grote's *Aristotle*, i.; and the translations of the *Categoriæ* by Maimon, 1794, and Heydenreich, 1835.

[1] *Logic*, i. 83; *cf.* Bain, *Deductive Logic*, App. C.

II

LOTZE'S LOGIC

THE translation of the volumes in which Lotze, towards the close of his long career as thinker and teacher, began to arrange in systematic form the ripest fruits of his reflection, is a contribution of the highest value to English philosophical literature. The *Logic* and the *Metaphysic*—the untimely death of the author has deprived us of his work on Practical Philosophy — contain a treatment of the main speculative problems distinguished by acuteness, breadth of knowledge, critical caution, and profound sense of the deep importance of the questions discussed. The historical position of the author gives to these volumes a unique interest. For Lotze might fairly have been described as the one remaining link of connection between the great epoch of systematic speculation in Germany and the more recent age of detailed, scientific research. The character of his mind reflected his historical position. No thinker of any time has more thoroughly combined the speculative instinct of the constructive philosopher with the cautious, practical attitude of the trained scientific investigator. If it be the ideal of the philosopher to work

[1] *Mind*, January 1885.—A critical notice of the English translation of Lotze's *Logic* (Oxford, 1884).

into a harmonious conception those thoughts which are the deepest, most far-reaching, most characteristic of his age, it would be hard to point to any one who has realised the ideal more thoroughly than Lotze.

Lotze's very excellences as a thinker, however, have their consequent defects. His training had given him a profound distrust of constructive metaphysics, a distrust so strong as to be sometimes, if not unintelligent, at least unjust. Yet he is animated by the true speculative impulse, and through the panoply of his cautious reserve the reader of his earlier works could obtain partial glimpses of a comprehensive, well-knit metaphysical idea. The excessive caution of the writer rendered it hard to form any complete notion of his deepest views, and the several parts of his work had, therefore, all the obscurity that belongs to the isolated fragments of an imperfectly known whole. Even in these latest volumes, in which the manner is more scholastic, more regularly expository than was Lotze's wont, something of the same obscurity is to be detected. The various assumptions, distinctions, views, through which the exposition proceeds, wait for justification from the completed whole; even his metaphysic is not fairly before us, since we still want his treatment of the philosophy of religion.

The close interdependence of the several parts of Lotze's work is certainly in no sense an objection to them. On the contrary, Lotze's writing has no more valuable lesson to give the student of philosophy than to teach him the impossibility of abstracting and isolating within its magic sphere. But the continuous feeling of interdependence renders the exposition difficult, and in the *Logic* these difficulties seem to me of a very peculiar and instructive kind.

Before proceeding to give some account of what Lotze embodies under the old title of Logic, I may be allowed to express to the translators and editor of the volume the feelings of gratitude and respect for their labour which I feel assured all students of Logic in this country will share with me. The volume ought to do much for the study of Logic in England, and the translation, if not positively attractive as a piece of English, will at all events not repel or unduly baffle a reader. Lotze's style is never easy to reproduce ; it always has considerable force and eloquence, while in his latest work it is unusually compressed and full of meaning. An elegant version in English could not be forced within the bounds of the original, and the present translation, which, so far as I can judge, is extremely faithful and accurate, suffers only from the inevitable evil of compression. The translators—for the task has been co-operative—have done their work with great ability, and the editor is to be congratulated on the wonderfully uniform style which the whole presents. I have not examined the whole translation minutely, but a selection of certain chapters yielded so small a number of weaknesses, and these of so unimportant a kind, as to confirm the general impression derived from inspection of the whole. The rendering of technical terms has also been very successfully achieved, though due uniformity is not always maintained. The rendering "conception and association" for "Fassung und Verknüpfung" (p. 406) is somewhat misleading.

The *Logic*, as the title specifically indicates, falls into three books or sections. The first of these, Pure Logic, or Thought, is a systematic exposition of the forms in which the logical activity of mind proceeds. The second, Applied Logic, or Investigation, is a much less systematic

treatment of the various ways in which the confused, entangled mass of concrete experience is brought into conformity to the ideal forms of logical connection. The third, Methodology, or Knowledge, is a free discussion of the fundamental problem which emerges from the exposition of the logical activity of mind, the problem of the foundation of knowledge, of the relation between the forms of connection making up the logical ideal and the nature of the real to which experience points. In all three books the reader will find not merely much that will throw light upon logical difficulties, much that will suggest problems of a subtle and profound character, much that may correct hastily adopted theories, but also, to put it generally, a quantity of philosophic thinking so elevated in tone, so sagacious in procedure, as to afford mental exercise of the most improving kind. There is no logician who will not learn much from Lotze's work. On the multitude of interesting detailed questions that appear throughout the volume I do not propose to say anything, and in particular, I must here omit all that concerns the treatment of the commonly called Inductive Logic in the Second Book. The general point of view from which the methods of research are regarded seems to me most excellent; indeed, the only point from which they can be consistently and with profit regarded. And I merely call attention to the weighty and well-expressed note in which Lotze gives his opinion on the logical calculus. With regard to the whole Second Book, however, one must take the advice Lotze offers in his preface, "to regard it as an open market, where the reader may simply pass by the goods he does not want." It is more critical than systematic, and the treatment strengthens the opinion, which one might defend on general grounds, that the methods of scientific investiga-

tion and proof are not capable of being thrown into a rigidly coherent and logical form.

The main interest of the work is to be found in the general idea of the logical activity of thought which inspires the whole, and out of which the characteristics of the familiar logical forms are developed. It is by no means easy to give a complete account of this general idea, and Lotze has himself preferred to allow its features to become apparent in and through the details of the exposition. He deliberately declines to formulate his view as an introduction, either in the way of describing and assigning its exact position to the logical act or in the equivalent way of discussing the place Logic is to hold in a systematic scheme of philosophy. It is of service for the reader of the present work to consult the earlier treatment of Logic which the author put forward under the more immediate influence of the philosophical tendencies of the last generation, and which in essentials is reproduced in the first book of his later treatise. In the introduction to the small but richly suggestive *Logic* of 1843, Lotze discussed two main conceptions of Logic, those of Herbart and Hegel, by comparison with which he was enabled to define the two main features of his own doctrine, features which reappear, though less explicitly put forward, in the later work. On the one hand, while sharing with Herbart the view that the logical forms are to be assigned to the activity of thought, an activity of one specific mode of mental existence, he dissents from the conclusion which Herbart drew, that these logical forms had no validity or significance other than that which belonged to them as specially complicated expressions of the psychological mechanism. From psychology, from the natural history of the mental life, no light, he held, could be thrown on that which is the very essence

of the activity of thought. The same dissent led him to reject the purely formal functions which by Herbart were assigned to the logical connections of ideas. It would do injustice to the meaning of the notion, the judgment, the syllogism, if these were regarded simply as ways in which consistent ideas were put together, or inconsistent ideas held asunder. When we reflect over the real content of the several acts of conceiving, judging, reasoning, we cannot resist the conclusion that their significance is not exhausted by the mere statement of the mechanical conditions under which psychical facts combine or oppose one another. The unique objective reference which is essential to thought is not explicable in the terms ap propriate to the natural history of ideas.

On the other hand, Lotze as strongly dissented from the Hegelian conception of Logic, in which it appeared to him an arbitrary and indefensible identification of thought and reality was the mother-error. Thinking and reality are in essence distinct; however close may be their relations to one another, and however the two may stand as parts of the sum total of being, they are not rashly and as a first step to be identified. The conception of a Logic which should be at once an exhibition of the ways in which thought proceeds and of the essential forms of reality seemed to him confused and misleading. Thought after all is reconstructive in character; as he puts it in his later work, "the human mind does not stand at the centre of things but has a modest position somewhere in the extreme ramifications of reality." The formation of knowledge is a gradual process, and it would be absurd to suppose that there is even a precise correspondence, much less a substantial identity, between the tentative effects of thinking and the modes of real existence.

As in contrast to these opposed conceptions of Logic, Lotze contemplates the middle course which at once recognises the essentially *subjective* or *formal* character of the activity of thought, and at the same time gives full justice to the claim, which thought at all events makes for itself, to be in close relation with reality. "Logic is certainly formal in the sense that it is a theory of the operations of thinking through which the subject works its thought into knowledge; it is as certainly not formal in the sense that these forms of thought are mere psychical facts standing in no express relation to the problem of knowing the real. Logic is certainly not real, in the sense that its forms are elements of the essence of things, but it is real, in so far as these forms depend on elements of the essence of things, in that there lie in the nature of things motives which constrain the thinking spirit to take in the movement of its own thought exactly those forms of apprehending and conjoining objective fact" (*Logik*, 1843, p. 13). In the introduction to the present work, a shorter course is taken to define provisionally the scope of Logic, and the needful explanations appear only in the course of the detailed expositions. Thought as a specific function of the thinking spirit, operating on the material supplied in and through the mere mechanism of the soul, is taken to be a *means* to knowing. As *means* or instrument, it unites characteristics of its own and of that which stands as its correlate, the real to be known. It needs hardly to be said that even a provisional statement, the import of which is so grave, demands the most careful scrutiny. In terms it reads like much that one has been accustomed to meet in the ordinary text-books; the significance which Lotze attaches to it can only be understood when the whole of his work is taken into account, and it

is possible that a critic, with the utmost desire to be fair, may do injustice to a proposition so many-sided and subtle.

The earlier *Logic* was rather more open in its explanations. We read there that thought has its own specific nature, and therefore its forms have a character distinguishing them from the real which under any supposition is contrasted with thought. At the same time, these forms of thought, the acts of thinking, have a colouring due to the nature of the real or to something which is even more closely connected with the real than thought itself. This something is more closely defined as the metaphysical categories, the ultimate assumptions (*Voraussetzungen* is the term used) which reason finds itself compelled to make in regard to the real. Thus thought holds a peculiar and intermediate position. On the one hand, it is opposed to, and distinct from, the mere sequence and combinations of psychical experience, which the natural laws of mind bring forward; in each of its acts and forms there may be traced the special feature of critical reference to a ground or determining condition; and the succession of logical acts may be regarded as a series of steps through which the critical activity of thought proceeds in the attempt to arrange the whole material of experience as a coherent, determined reconstruction of reality. On the other hand, the forms of thought are not identical with the fundamental assumptions of reason in respect to the nature of the real; they are but ways in which the psychical experience, the *Vorstellungen* of the thinking spirit, is brought into conformity with these assumptions (*Logik*, 1843, pp. 18, 23).

The later work is less explicit in its introductory statements, but its procedure manifestly turns upon the same considerations. There is implied throughout, and more fully defined in the detailed discussion, a comprehensive

conception in which no opposition of the real and the spiritual experience of the individual is involved. Thought, as belonging specifically to the individual thinking spirit, may, indeed must, stand in such relations with the real as follow necessarily from their conjoint existence in the sum total of being. But its nature generally, and the characteristics of its particular forms, exhibit, when scrutinised, clear marks of the fundamental difference that obtains between them. The world of thought is the changeless, dateless realm of ideas, in which is no becoming, no development, no existence as fact. Ideas have validity, but not factual reality. They are true, but not existent. And though the animating principle of thought is, in the later work, expressed more cautiously, as the act of "adding to the reproduction or severance of a connection in ideas the accessory notion of a ground for their coherence or non-coherence," yet the exposition of the successive stages through which the principle finds realisation is dominated by the reference to metaphysical assumptions regarding the real. Much of the later work, the Third Book in particular, is but a free, semi-historical defence of the peculiar position assigned to thought.

Without offering for the present any criticism on the ultimate view which is involved in Lotze's method of regarding Logic, I would point out that Lotze finds himself in some difficulty when the question arises how the forms of this logical activity are to be discovered. It is by the notion of *ground*, applied to the conception of the contents of perceptive and representative experience, that is to say, by a rather easy psychological reflection, that he helps himself along, and makes the first all-important step. The mere notion of a ground for the combination or severance of ideas that may have come

about mechanically through the natural laws of mind, implies the consciousness of a distinction between the simply subjective play of thought and the content of those thoughts which seem to enjoy a peculiar species of objective being. No question with regard to validity or truth can possibly arise until the psychological data have undergone the remarkable process to which Lotze, following earlier thinkers, gives the name of Objectification. The *object*, be it remarked, and Lotze is careful to remark, is not to be simply identified with the real; it is for thought, in thought, and by thought. More closely examined, it will be seen that the act of objectifying is at once an act of *positing*, *i.e.*, setting a content before one, distinguishing and comparing. The characters of the posited content, the distinctive marks by which one object is opposed to another, the possibility of comparing, are given, not made by thought. In particular, Lotze thinks, it is a merely fortunate fact, that the world of cognisable stuff affords means of comparing and universalising. That things should present themselves as comparable in degree, number, and extensive quantity, is no necessity of reason, but a fact which thought has thankfully to accept, and without which its most complex acts would be deprived of their essential basis. These elementary processes, through which perceptive and reproductive experience receives form as knowable matter, have left traces of themselves in the fundamental types of grammatical forms; but they are to be viewed as preceding the specifically logical acts, as prerequisites for the critical activity of thought rather than as forming part of it. The main types of the logical act Lotze takes without further discussion. Concept, judgment, and syllogism are ways in which the problem thought sets before itself, that of reducing experience to a systematic

whole in which each combination or separation shall have its ground, is gradually solved. The activity of thought, which finds successively expression in the form of concept, judgment, syllogism, is a higher development of the same function through which the idea of an objective order became possible, and in its development presupposes and rests upon the results of that function. Logical thought, in fact, is to be regarded as a continuous criticism of the crudely formed experience in which ideas of individual facts and vague general representations of similarities are already given, a criticism animated by the single principle that for the conjunction or severance of facts in presentation adequate grounds can and must be disclosed. The concept, the judgment, the syllogism are modes in which *coherence* as opposed to mere conjunction of fact is represented. That it should be possible to obtain a coherent representation is a fortunate accident, depending on an arrangement of the real contents of experience which is not itself a necessary truth; for it is quite conceivable that, even to a spirit animated by the principle of logical connection, experience should offer a dislocated mass of isolated facts which would allow no exercise to its logical function. The same general consideration lends strength to the conclusion, for which other grounds may be adduced, that the forms of logical coherence are not to be rashly viewed as in themselves modes of connection of the real. The relations of universal and particular, of condition and consequence, have no *existence* as facts. They are valid forms of thought, and have a content of their own, but they have not existence as things or even as reciprocal modes of things. What their content is Lotze allows to appear only in the course of the exposition which traces their development; and he leaves much more obscure in the later treatise than

in the earlier *Logik* the answer which might be offered to the question, What determines the varieties of content? For it is not immediately apparent why the merely formal demand for coherence should obtain practical satisfaction in the way of concept, judgment, syllogism, or rather in the assumed relations of which these are the subjective modes of realisation. In the earlier *Logik* the reference to the ultimate metaphysical assumptions supplied a partial key to the difficulty : the concept there appeared as the mode of apprehending the logical substance ; judgment as the way in which the relations of universal and particular, of determining rule and determined instance, of conditions and consequences, relations implicit in the content, were subjectively expressed ; and syllogism as the mode of representing the systematic whole in which universal and particular, ground and consequence, rule and case are the isolated, abstract parts. In the later work, the scrutiny of the logical forms proceeds with greater freedom, and though it follows the same path, it makes less distinct reference to the underlying metaphysical question.

The essence of the Concept Lotze finds in the peculiar thought which accompanies the presented or represented features, whether mere singulars of perception or generalities formed by the unconscious operation of the discursive activity, the thought of the determining rule or basis. In the process of conceiving, the object, whether a genus or an individual, is viewed as containing in its content the determining rule from which follows the combination of marks making it up. This rule or logical basis is a higher universal than the mere generic image, and it is not formed by the mere omission of marks, which the ordinary logic takes to be the mode of formation of notions. Nor is the relation of rule to determined particulars exhaustively

given in that of whole and parts; there fall therefore to be rejected, as but clumsy adumbrations of the truth, many of the "properties of notions" with which formal logic has delighted itself.

The concept, however, is an imperfect expression of the logical activity. It is itself but a transitory form, midway between the immediate, confused, and incoherent knowledge of the object which is appropriate to perception and the completed cognition in which all that enters into the object would have its value, position, and relations adequately determined. Moreover, it simply places the determining rule alongside the specific features, whether constant or variable, of the objects conceived, and leaves it undecided how, precisely, we are to understand the relation of the universal to its particulars, of the logical substance to its accidents. A more definite attempt to express the nature of the thought-relation between the opposed elements is found in the Judgment. The essential factor in the judgment, the copula, has no other function than to convey the notion which we form of the relation which binds the material contents of experience into conceivable coherent form.

The instructive survey of the forms of judgment, occupying the two chapters of Lotze's First Book, raises many points of interest to the logician, but it is the less necessary to dwell on them since the theory has already been brought before the English reader, partly in Mr Bosanquet's "Logic as the Science of Knowledge," in *Essays in Philosophical Criticism*, partly in Mr F. H. Bradley's *Principles of Logic*. The main object of the survey is to determine the value of the form of judgment as a mode of expressing thought-relation among the contents of ideas (*i.e.*, of psychologically given experience).

It is a kind of criticism but little familiar to logicians; Hegel only, to whom Lotze owes here and throughout much more than he is disposed to acknowledge, has subjected the form of judgment to a similar analysis. Lotze himself is probably much influenced in his grouping of the modes of judgment by the general consideration of the successive grades of knowledge, from its crude indeterminate beginnings to the ideal goal of completed systematic insight; and this consideration supplies a serviceable key to the distribution adopted. The impersonal judgment, the simplest form, while bearing on its surface the mark of the distinction into subject and predicate, which is at once the essence and the perplexity of the judgment, yet leaves the subject entirely undetermined, and so throws little or no light on the kind of relation which in judgment as such is contemplated as uniting subject and predicate. The ordinary categorical judgment, asserting that the subject *is* the predicate, finds itself at once met and baffled by the question, How can one determined and distinct content of thought *be* another? References to the relation of substance and accident, thing and property, do but throw the difficulty forward and convert the simply assertive judgment into a more complex form. In his criticism of the categorical judgment Lotze traces the perplexity mainly to the contradiction between the form of judging and the law of identity; for while the one asserts that S (which is a determinate content) *is* P (another determinate content), thought, proceeding under the law of identity, refuses to contemplate an S which is anything but S, a P which is anything but P. It does not seem to me that the criticism is at all furthered by the appeal to this so-called law of thought; for the solution of the difficulty is to be found, and is found by Lotze, in

showing that the abstract conception of identity has no real application to the case in question. A thought which could proceed by affirming only identity of content is no thought at all. It would have been better simply to insist on the patent fact that the merely assertive judgment, the qualitative or positive judgment, fails to express what it proposes to express, fails to show how a unity is possible between the diverse logical marks of its two factors, the subject and the predicate. That the universal is in some way the particular, and *vice versâ*, that the individual is only a determinate, fully known fact when more than an isolated unit,—all this is implicit in the mere assertion contained in the simple, qualitative judgment; but the form of the judgment is wholly inadequate to the thought which is implied in it. Lotze, however, constantly tends to view the world of thought, of ideas, as that in which the bare, abstract rule of identity is the all-supreme law, and finds in this a peculiarity of thought which effectively distinguishes it from reality.

Escape from the perplexity of the categorical judgment Lotze finds, first, in the transformation which the assertion undergoes when it is quantitatively determined as expressing of all, or some of the subject, the previous predicate. Even here, however, as he insists, the logical form is unequal to the task thought has imposed on it. We find ourselves either in the position of reasserting a blank identity, or reduced to a repetition of the impersonal existential judgment. It is only in the hypothetical judgment, which, by its very form, denies the supreme validity of the abstract rule $A = A$, that the logical form of thinking finds for itself a means of expressing a relation of differences that is at once a unity for thought, and yet not a blank identity. The law of sufficient reason thus stands alongside of and

supplementary to the law of identity ; yet Lotze, true to his preconception of the nature of thought, will have it that the superior and fruitful principle is of but inferior validity, that it is no necessity but a fortunate fact, an assumption "the truth of which is guaranteed by the concentrated impression of all experience." One hardly knows what to make of this, or how to understand the curious property of thought, which, subject in its own nature to an absolute law of a most stringent, but perfectly worthless character, shall yet make an assumption violating its own law and delightedly find that the thinkable world conforms thereto. It is a specimen of Lotze's excessive caution, and perhaps the consequences that would seem to follow from it might be invalidated by some portion of his metaphysical theory of the real. I note it here as bearing on the general view which animates much of the author's polemic against other philosophies.

The final, most developed group of forms of judgment appears as supplying a much-needed addition to the hypothetical. In the latter, there appeared, in the only way which could satisfy thought, the principle that the individual is determined by the universal. The individual *is* not the universal, but it is individual only through conditions or grounds, the interconnection of which is itself represented only by a universal proposition. This interconnection justifies and explains the quantitative determination which appears in the general (or, as we might call it, *abstract*) judgment, in which the predicate P is asserted of S, *i.e.*, of any individual S, because this participates in the general characters of S from which follow as consequence the predicate P. And since it is not P vaguely or generally that follows a vague, indeterminate S, but a particular modification P_1, P_2, or P_3 which follows a modification of

S—S_1, S_2, or S_3—the general judgment finds its complement in the disjunctive. The disjunctive judgment, again, while the completest form in which, by judgment, the unity of subject and predicate can be expressed, has its mark of imperfection in the undetermined choice of alternatives which it offers. It shadows forth the union in thought of subject and predicate; but as it at the same time, while explicitly pointing to a systematic interconnection as the basis of such union, does not contain the interconnection, it finds its supplement in the Syllogism, the mode of thought in which the interconnections of the conditions with that which they bring into a unity of thought is formally expressed.

The serial arrangement of judgments finds its counterpart in the distribution of syllogistic forms; but here the material for discussion is too rich to allow of any thorough examination. It is good that attention should be drawn, as Lotze's chapter cannot fail to draw it, to the precise character of the forms of inference familiar to ordinary logic as the categorical, inductive, and analogical syllogisms, and to the inadequacy of these to discharge all the work which thought has to perform in framing a logically coherent conception of experience. The more complex forms, the quantitative and the classificatory, present problems of a special character; and on the whole one's feeling sometimes is that Lotze's method of transition is arbitrary and artificial. One misses the stringency of a connecting idea from which these varieties would follow, and though one thankfully accepts what Lotze frankly offers regarding the ideal type of completed, systematic cognition, it is not easy to understand its full drift or to perceive its bearing on other portions of his exposition. Without discussing these points, I proceed to notice the

general problem which underlies the whole work, and which is formally though unsystematically discussed in the Third Book, the problem of the relation between the structure of thought and the nature of reality.

Lotze has chosen to develop his views in a semi-historical fashion, criticising various conceptions of value that have come forward in the history of speculation, and defining his position in reference to the aspects of the whole problem so presented. The problem itself may be variously defined as an inquiry into the worth for reality of the forms of thought, or as an investigation of the nature and grounds of certainty in knowledge. The discussion of Scepticism yields two important results, on one of which at least there can be little misunderstanding. That the sceptical view of knowledge implies the principle that reason is capable of attaining truth, criticising its own procedure and determining the worth of grounds, is an argument not less strong because it is familiar and direct. But the radical notion of scepticism, that knowledge, by its very nature as a mediating process, as a connecting link between reality and the thinking spirit, is for ever incapable of attaining to a perfect cognisance of the real, is subtle and many-sided, requiring no small care in handling, if any result of value is to follow. Lotze, so to speak, turns the flank of the sceptical doctrine, by insisting that, after all, knowledge can be nothing but a mediating process, can be nothing but the systematising of what is given in the experience of the thinking spirit, and therefore that any question regarding the *truth* of knowledge must be expressed and discussed in terms that are appropriate to the matter in hand. The abstract nature of things, which presents itself as an element in the sceptical reasoning, is after all a conception, the notion of what the order of things must be ;

and the problems which scepticism had formulated in an unintelligible and unanswerable fashion must be restated. It must be asked, what are the characteristics of assured and certain cognition within that world of knowledge in which only the venue lies? One form of answer, a significant and far-reaching thought, Lotze finds in the Platonic theory of a world of Ideas; and the discussion enables him to advance a further position of his own doctrine. The Ideal world may be the home of certain and consistent contents of thought; but the mode of existence of these thoughts, it must be definitely recognised, is not that of real being as things, or even of occurrence as events. They have validity, but not factual existence. Within themselves they may form a concatenated system, from point to point of which the thinking mind may proceed with the certainty of insight; but Plato could not explain, nor does it seem within the scope of the theory to explain, the kind of relation which must be thought between the realm of the eternally valid ideal contents and the reality of things. Even if we allow that in the Ideas is to be found a system of interconnected parts, the Platonic teaching afforded no answer to the deeper question, What are the ultimate elements or principles, and how are they related to the dependent portions of the system? The attempt to answer this new problem Lotze takes to be the gist of the opposed doctrines of modern philosophy in respect to the origin of knowledge, the *a priori* and the empirical. His criticism rests upon a general assumption or metaphysical principle applied to the special case of interaction between the reality of things and the thinking mind (§§ 325ff.). The result of action on the mind is invariably conditioned by the nature of mind itself, and only in the special forms in which that nature expresses itself can the result make its appearance.

Experience, therefore, must always exhibit an *a priori* side, and only in experience can the *a priori* truths, the formulations of what is the essence of the thinking mind in its contributory function, be discovered. The necessity and universality, the self-evidence, characterising these truths, cannot be exhibited as resulting from isolated psychological events; nor is it by the psychological method that insight into the peculiarity of knowing can be obtained.

Throughout these discussions there has been quietly growing in strength the doctrine that the formed product, knowledge, depending as it does on the peculiar nature of the thinking spirit, has a special mode of existence, and that its modes, though doubtless corresponding to elements in the reality of things, are not themselves to be taken as forms of the real. In the fourth chapter this doctrine receives explicit statement and ample illustration. The reality which appears in the formed content of thought is "wholly dissimilar to existence and can only consist in what we have called Validity or in being *predicable of* the Existent." Nay, even the content apprehended in knowledge has the peculiar timeless and changeless mode of being expressed in the Platonic Idea. It is indifferent both to the subjective movement of thought and to the changes of the empirically presented world of perception in which the real seems to be directly given. In this last clause is found the final problem for Lotze's view of thinking. How can we represent any relation between the world of thought-contents (about which we can make only one assertion as necessary for thought itself, viz., that each thought-content is itself and no other) and the changing stream of perceptive experience? Having brought the separations of knowledge to their ultimate form, how are we to understand the junction which appears to take

place? The answer which Lotze makes depends to a large extent on the manner in which the separations have been expressed, but it is fairly given in the three positions signalised by him. First, any assertion within the sphere of knowledge regarding real existence is hypothetical. Secondly, we must assume that the empirical, perceptive world has law in itself. Thirdly, we may obtain, by a scrutiny of perceptive experience itself, certain directly given synthetical truths, on the basis of which thought, discursively proceeding by its own formal rules, may confidently hope to erect a structure of knowledge that shall not only be consistent but in harmony with the laws of fact. On the first and second of these positions I offer no remark; they are simple statements in appearance, but in reality conceal a whole philosophy. The third is the most interesting, for it brings to the front the question which throughout the *Logic* has been in the background: To what extent has Lotze succeeded in justifying his restriction of the functions of thought to the discursive, mediating act of passing from premisses to conclusion?

On this limitation depends the worth of his separation between logical and metaphysical relations, and the validity of his general view of the logical forms. Thought has been placed in opposition to the real, as antithetical to, though corresponding in some way with, it; in the movement of thinking the apprehended content has inevitably found expression in the forms of concept, judgment, syllogism; yet these forms, it is insisted, are in no way relations of the real. Now we find Lotze introducing a new distinction, from which would follow a far more serious restriction of the function of thought, a much more limited notion of the significance of the logical forms. Dealing with knowledge, he reinstates the Kantian doc-

trine of synthetical *a priori* judgments, assigns these, however, in a thoroughly un-Kantian fashion to a perception which does not contain the element of thought, and regards them as self-evident, intuitively grasped data, from which the discursive, elaborative activity of thought may proceed in the construction of a knowledge that adequately represents the real. One would raise little or no objection to what is said regarding the self-evidence of these data, and the necessity in the long run of resting knowledge on self-evidencing judgments; there is here, doubtless, one of those fruitless problems of philosophy which owe their origin and interest to the enormous difficulties of stating simple facts. But one cannot avoid asking, What, then, in their nature, are these primitive data? Are they *judgments*, apprehensions of a connection in real fact, which by inherent light approve themselves as being connections in fact and not merely subjective modes of apprehending? Only the affirmative answer can be yielded by Lotze, though, as was said, he prefers to disguise the answer by using the term "perception." If then we insist that thought has only to deal in the fashion of elaboration with such formed products, we must recognise that, in so using the term "thought," we refer not to that which is responsible for the specifically logical forms of concept, judgment, and syllogism, but to the mode in which thinking as a phase of the concrete psychical life of the individual mind is carried out. We can no longer maintain that to thought are assignable the fundamental arrangements that make up the essence of concept or judgment; by thought can only be meant the special exercise of dealing with material already formed, in the modes which we have called the forms of judgment and concept. That there may be such a discursive exercise may pass without further question; the restriction of the

word "thought" to it has no justification, and it excludes us from regarding the logical forms as in any way expressing the essence of thought.

It is not from one portion only of Lotze's exposition that one would reach the same result. Looking back on his account of the procedure of thought, we find that he starts his survey of the logical activity with the presupposition that material for thought has already received a special handling, has already been formed into definite objects, with distinguishable and comparable marks; and, moreover, in the history of the logical activity, the somewhat vague notion of *ground* has been made to play a very remarkable part. For under its cover there have been quietly introduced into the contents of thought, of the concept, *e.g.*, the all-important features, aspects, of determining and determined, of essence and appearance, of law and modifying circumstance. If one asks,—What, then, are these aspects of the objective content conceived (apprehended in form of a concept)? Are they *thoughts?*—no explicit answer is given. Lotze has been consistent in holding that underneath the logical operation of thought, in the wider sense in which he used that term, there have always lain the metaphysical assumptions; but he has never fairly faced the question whether these are not in their essence thoughts. The difficulty of accommodating the logical activity to these ultimate determinations of objective reality becomes still greater when his narrower conception of thought, as a merely elaborative, mediating process, is to the front. For then one may fairly ask: If knowledge, the whole structure that is due to the operation of discursive thinking, be based on immediate data, which are in form judgments, but which cannot be exhausted by the one law of discursive thought; if the procedure of thought involve throughout

determinations that are not traceable to the activity by which notions, judgments, and syllogisms as modes of elaborating come about ; if, finally, the ideal which thought involves cannot be expressed as the reduction of experience to an analytical whole,—is it not entirely without justification to identify the discursive activity with thought? Are not the accompanying features of this discursive process the genuine characteristics that make up the essence of thought? and is not the discursive process itself but a phase of the concrete life of spirit, the analytical effort of understanding?

It is the opposition between the apparently timeless and changeless content of thought, and the changing, temporally modified content of perceived reality that weighs most with Lotze and causes him to distinguish so sharply Logic from Metaphysic ; yet without diminishing the opposition, one may well doubt the interpretation he has given of it and the conclusion he draws from it. Were one to allow to the fullest extent that the essential aspects of the real, those by which it is intelligible for us, are in their nature "thoughts," and that "thought" is but another name for the system of such thoughts, one would still recognise that, when thought is taken in abstraction from the concrete reality of thinking mind and external reality, it presents the timeless and changeless character of the Platonic Idea. But such result is due to the abstraction that has been made ; it is we who make the opposition, not the nature of things ; and the characteristic of the realm of ideas attaches to it not as an entity in itself, existing in isolation from the real, but as an *abstractum* with no independent, *factual existence*, not even existence of a kind different from that of the real. The world of thought *per se* is truly a "kingdom of shadows" when we compare it with the full reality of concrete existence, but not on this account should we

suppose that thought is somehow divorced from things and has but a formal function in their regard. The perplexities to which such a supposition leads take ample vengeance for the error of mistaking a distinction in thought for a distinction of thought from things.

The minor oppositions which prey upon Lotze seem to connect themselves with the same fundamental consideration. The life of the individual subject contains no perfect picture of the world of being; that there should be much in it which but imperfectly represents the real relations of things—that the human mind should pursue many a devious path and be liable to varied error—is hardly surprising; and one need not on that account suppose an original and impassable separation between reality and knowledge. The consideration of the ways in which our thinking attains to knowledge, of the methods by which crude imperfect experience is transformed, belongs to Psychology rather than to Logic. In sum, what Lotze has marked off as Logic seems to be no independent doctrine, but in part the fragment of a larger whole, the treatment of thought, which is Metaphysic, in part belonging to the history of the development of knowledge in the individual mind, which is Psychology. That Lotze uses Psychology in a narrower sense, that he tends to contrast the psychical mechanism with thought, may be regarded as an expression of the deep-seated disinclination he throughout manifested to contemplate a constructive, systematic philosophy. Justification for the view can be found only in his final metaphysical conception, which, at all events in large part, is accessible in the *Metaphysic*. In a subsequent notice of that work, I propose to consider farther the bearings of his general philosophical position on his treatment of Logic.

III

LOTZE'S METAPHYSIC [1]

In the *Metaphysic* Lotze sums up, with ample historical and critical detail, views which in many other forms he had already laid before the world. If, however, it is to be said that the work contains little absolutely new to the readers of his earlier philosophic productions, it is to be added that only in it is there given the fulness of statement required to make a speculative thought intelligible, and that in this, his latest effort, Lotze's remarkable powers of subtle expression, wide knowledge of the manifold issues raised at every step in speculative construction, and keen sense of the bearings of metaphysical thought on real experience find their amplest scope and bear their richest fruit. No word need be said of the value of the *Metaphysic* as mere discipline. Instructive as Lotze's method always is, whatsoever be the matter to which it is applied, it is here more than ever of significance. The work is a monument of careful, profound, and comprehensive thinking. But it is sufficiently recognised that in Lotze, Germany and the world have lost the last representative of a great philosophical tradition, and that his works must be taken to heart by any student who desires to know how

[1] *Mind*, October 1885.—A critical notice of the English translation of Lotze's *Metaphysic* (Oxford, 1884).

the problems of speculation still connect themselves with the ever increasing mass of special knowledge that the labours of the new generation have accumulated. Our business, at present, is solely with the one closely knit view of things that forms Lotze's metaphysical conception, a view that has given connectedness to his researches in many special fields, that has grown with his growth, and that finds here its most explicit statement.

"Except in rare cases," Lotze has said,[1] "a prolonged philosophical labour is nothing else but the attempt to justify, scientifically, a fundamental view of things which has been adopted in early life." There is certainly a wide difference, in form and in detail of treatment, between the *Metaphysik* of 1879 and the early, little appreciated work with the same title of the year 1841; yet the slightest comparison of their contents enables us to see that the fundamental conception has remained the same, and that the difference arises, in part, from a relinquishment of the method which in the earlier work exhibits clear traces of the then prevailing philosophy in Germany, in part, from the increased fulness of special experience with which the fundamental thought is connected. In both the fundamental conception is that of ethical or teleological idealism —the view of the sum total of things as the unfolding of a plan, of which the significance is spiritual, of which the fixed traits are the general laws of order and connection in nature, and of which the manifestation is the varied realm of things.

The manner in which a thinker arrives at his deepest conviction or is led to give definite form to his thought has always more than mere personal interest. The influences which have weighed with him, and which enter as com-

[1] *Contemporary Review*, January 1880, p. 137.

ponents into his view of things, are not to be regarded as mere external accidents; they form the very substance and in some ways the most significant element of his views. The function of a metaphysical doctrine is to give a unity to experience, and the character of the experience taken in is an essential constituent of the doctrine itself. Lotze has not left to conjecture the task of determining what in his case were the historic circumstances under which his thought was developed. In the interesting account of his early speculative impulses given in the *Streitschriften* (1857), he permits to be seen with the utmost clearness the two great forces which operated on him. These were, briefly, the idealist philosophy of which Hegelianism was the prominent representative, and positive natural science then beginning its extraordinary development in Germany. The opposition between science and the application which Hegelianism had made of idealist philosophy to the details of real experience was in Lotze's mind decisive as to the need of reconstructing, or stating what seemed to him of permanent value in, the great speculative thought of idealism. One may think that he was never quite just to the method of Hegel, that he failed to distinguish what was extraneous to it from its essence, and that his keen sense of the dangers which it had not avoided occasionally carried him too far in the other direction; but it must always be admitted that he undertook the recasting of the idealist conception with an infinitely fuller knowledge than his predecessor of the real experience to which it must be applied, and consequently was enabled to enrich and expand the thought with which at heart he was in entire agreement. It may perhaps prove that the chief value of the *Metaphysic* will consist in its service as introduction, from the more modern point of view, to the bolder, more comprehensive

idealism of Hegel. Some perception of this was doubtless operative in inducing the late Prof. Green to devote so large a portion of his industry to the translation of the present work. Quite a third of the volume is due to him.

To Lotze himself, as one may gather from many detached criticisms and from the general tenour of his whole treatment, there appeared to be one vast difference between his own conception and that of Hegelianism, a difference extending beyond and lying at the root of the manifest divergence of method. In laying out the matter of metaphysic, Lotze adopts on the whole the method of Herbart, and generally is of opinion "that it is only inquiries conducted in the spirit of realism that will satisfy the wishes of idealism." But the superficial difference of arrangement only indicates the deeper opposition in which Lotze stands to the Hegelian method. To him that method seemed to imply the view that the ultimate nature of reality was to be found in and was exhausted by a symmetrical interconnected system of thought-determinations, from which in some way the real proceeded, of which the real was in some way the imperfect manifestation or shadow. Even though at times he is forward to acknowledge that in Hegel are found correctives of such a view, he is yet consistently of opinion that the Hegelian method leads to nothing but a rehabilitation of the Platonic impassable and unworkable division between the realm of absolute thought and the changing, variable, transitory, and relatively non-beënt world of finite fact. To such a conception he stands in irreconcilable opposition and would press as against it the view that found in Aristotle its early exponent. With a statement of the opposition the *Logic* closed, with a restatement of it the *Metaphysic* opens.

It is not, says Lotze, consideration of the pure relations which hold good of the contents of thought that can force on us the metaphysical problem. For of these relations it cannot be said that they are, that they exist, but only that they hold good. Change is predicable of them, only by metaphor. In the world of the thinkable, condition passes not into conditioned, but remains valid with it in eternal, timeless quiescence. The characteristic of the real, its constant change, is no content that can be constructed by thought. Being and non-Being, as thought-contents, stand for ever side by side, each identical with itself and, for thought, irreconcilable with the other. Only an experience that is not pure logical thought brings before us as living fact the changing play of real existence; only in experience that is more than, other than thought, do thought-relations obtain realisation.

"The true reality includes as an inseparable part of itself this varying flow of phenomena in space and time, this course of things that happens. This ceaselessly advancing melody of event—it and nothing else—is the metaphysical place in which the connectedness of the world of Ideas, the multiplicity of its harmonious relations, not only is found by us but alone has its reality." [1]

It would certainly be impossible to exhaust in a single statement the implications of this strongly marked antithesis; only from a connected view of the consequences flowing from it, can one hope to arrive at adequate insight into its significance and worth; and to the exposition of such a view the *Metaphysic* as a whole is devoted. Before turning to the main line of speculation, we may consider for a moment certain preliminary doctrines which concern mainly the method to be pursued, but which likewise

[1] P. 73; *cf.* pp. 78, 84, 135.

connect Lotze's speculation in an intimate fashion with one at least of his predecessors in German philosophy.

It is an opinion which Lotze has repeatedly pressed, nowhere with more explicit statement than in the introduction to the present work, that metaphysic has no absolute method and must be content to start with any given problem of experience in the hope that systematic effort to clear up all the involved difficulties will find satisfaction only in a connected view of all the assumptions that for our thinking render the real conceivable. Assuredly, if by a special method were to be understood something lying outside the body of metaphysical thought itself, by application of which the course of procedure should be from the outset determined, no hesitation could be entertained in accepting his position. Thought has certainly no external standard to appeal to for aid in directing its procedure, nor any external means of testing the progress it has made. Itself is its own light. Even less doubt could be entertained as to the truth of the opinion, and still less value would that opinion have, if it were interpreted as meaning that the ways in which subjective thought gradually attains insight into those assumptions which it must make in order to give consistency and clearness to the conception of real existence, are as various as individual thinkers and occasions of reflection. The movements of the individual's thought assuredly prescribe no laws to the real about which his thought is exercised, and need correspond in no way to those connections at which he ultimately arrives as expressing what he is convinced must be thought, if reality is to have for him consistency. But to maintain that the "forms of apprehending true Being without which we cannot think"[1] are interconnected; that in all its notions

[1] *Metaphysic*, 156.

mind is depicting only the universal features of its own nature,[1]—is, while perfectly compatible with the view that "philosophy is throughout merely an inner movement of the human spirit," [2] to grant all that could be demanded by the most ardent defender of a method peculiar to speculation. Doubtless, it is certain side-thoughts that give colour to Lotze's definite expression of opinion. He has in view pre-eminently the Hegelian dialectical method which appeared to impose on speculative thought one line of progress and which seemed to claim for thought itself possibilities of advance that, as Lotze thinks, can only be furnished by the special problems suggested in variable experience. But here, as throughout the *Logic*, Lotze seems to be entangled in the ambiguities arising from the double sense in which the term Thought is used by him. Thought is, on the one hand, the formal process finding expression in logical relations; on the other hand, it has the fulness of content that attaches to it as systematic representation of the assumptions necessarily made in regard to real existence. In the first sense, thought has certainly no power of self-development; in the second sense, a needless opposition is instituted between real experience and thought,—an opposition that Lotze has ample occasion to withdraw. The developed conception of the nature of real experience must contain an explanation of the remarkable union in thought of the apparently irreconcilable difference between the objective content and the subjective existence of thinking as in the individual spirit. It is the peculiar excellence of Lotze's view that it allows us to put those different sides in a harmonious relation to one another; but such a result is altogether incompatible with the strong antagonism manifested to the methodical prin-

[1] *Mikrokosmus*, iii. 539. [2] *Metaphysic*, 165.

ciple that in thought itself lies the spring of its own movement.

In one minor contention, Lotze finds himself in agreement with the view he otherwise opposes. Metaphysic cannot rest on or be preceded by a Theory of Knowledge. A criticism of knowledge is possible only on the basis of an underlying Metaphysic. In words at least, this opinion seems to stand in "unheard-of opposition to the tendency of our time." There may be thinkers who have understood the Kantian idea of theory of knowledge to be equivalent to "a psychological analysis of cognition," and who have deemed it possible to analyse knowledge in general on the basis of some hastily assumed psychological facts. Doubtless, too, the demand to consider how knowledge is possible before proceeding with satisfaction to concrete problems, may readily degenerate into an empty formula, worth little more than the old request to determine the eating powers of a chimæra *in vacuo*. Doubtless, finally, it becomes a weariness to have critics of the Critical Philosophy continually charged with misapprehensions of its genuine meaning. But it seems, nevertheless, worth while to say that from Lotze's reproach Kant himself must be taken as exempt. With all its appearance of psychological method, the "Transcendental Logic" has no other problem than that set by Lotze to Metaphysic, to determine the significance and connection of the propositions in regard to reality which "we believe ourselves to have no option but to maintain." The categories and other "playthings of philosophy" are not for Kant mere forms of subjective thinking; and that they should be put in most intimate relation to knowledge as constituting its essential structure is but to say that the connection of the real is only for mind. To examine the possibility of knowledge is not for Kant to give a psycho-

logical analysis of the constituents of knowing or a history of how it comes about, but to determine the ultimate meaning of the notions, propositions, or assumptions which are involved in the simple fact of experience. And, on the whole, whatever opinion may be formed of the limitations inherent in the Kantian method, one would be inclined to say, regarding the character of much post-Kantian metaphysic, that there is still need of Kant's strenuous warning that the significance of the ultimate forms of intelligibility can only be determined by viewing them in relation to thought. We may trace even in Lotze, though in him the due corrective is not wanting, a tendency towards treatment that closely resembles the pre-Critical method of Leibniz; and, in all historical reference to Kant, it should be borne in mind that the pre-Critical method was not foreign to him, that, *e.g.*, the conception of interaction as implying change of inner state among the individual members of a system was a point from which Kant started, not a new idea of scope wider than the limits of the Critical method.[1]

It is probable that to the influence of Herbart is to be ascribed Lotze's tendency to treat the Kantian and Hegelian method as inevitably falling into subjective idealism; for subjective idealism is the enemy against which Herbart directs his strongest attacks and has most sedulously to defend his own position. Lotze is certainly no Herbartian, and is right in declaring that, on the points on which his views approximate to those of his more immediate predecessor, both drew from a common source, namely, Leibniz;

[1] It is of interest to compare Kant's first metaphysical handling of the problem of real relations, in the *Principiorum prim. cognitionis metaph. nova Dilucidatio* (1755), with that of Lotze, *Metaphysic*, bk. i, cc. 4, 5.

but in the external form of his method he imitates Herbart, and throughout the *Metaphysic* the conceptions which he bears most constantly in mind are those of Herbart. Nor is this unnatural; for Herbart's metaphysic has a prevailing air of scientific realism. Herbart's treatment of such fundamental conceptions as those of change, substance, and cause comes near to the exacter determination of ordinary thought that characterises the best scientific method, and in some departments at least, as in psychology, the results are of the most excellent kind. It is possible at the same time—and for the view one would claim the support of Lotze—that the best results of the Herbartian treatment in the concrete spheres of research are independent of the peculiarities of the Herbartian metaphysic and can be combined with a conception of the whole nature of reality differing widely from that of Herbart.

The treatment of the first fundamental notions of Ontology—being, quality, reality, and change (Book I, cc. 1-4)—is directed so consistently against Herbart's doctrines that some notice of the latter seems needful in order to seize the full meaning of the result to which Lotze slowly works up. To Herbart, the task of Ontology was the elaboration or clearing up of the notions involved in or connected with the indirect affirmation of real being given in sense-perception. Philosophy, in his view, has to start from a foundation supplied to it, has to accept something as given, and has then to endeavour so to determine the nature of the involved thoughts as to bring them into conformity with the absolutely valid laws of our thinking—the laws of identity and non-contradiction. Experience in its simplest phase, sensuous perception, no doubt offers us much that is incoherent, self-contradictory, and standing in need of elaboration; but of one lesson it

teaches there can be no doubt: it teaches that something is. Even if all the content of experience be characterised as phenomenal, even if we admit that sensuous perception as qualitative state of a percipient can in no way be identified with the quality—the *what*—of the real corresponding to it, yet the fact of perception, the order and method of perceived content—order and method which are as much given as the content ordered—force upon us the thought of an independent real from which they follow. The course of philosophy is thus arc-like: it starts from the groundwork of experience, is driven onwards and upwards to the conception of a reality that is not in experience, and has to descend again in explanation of experience with the wealth of notions that it has gathered in its progress. But the course of thought is never other than subjective. The contradictions inherent in the crude notions of experience drive us to supplement these notions and to form more complicated conceptions which allow thought without self-contradiction to deal with experience; but the supplementing remains a work of thought merely and indicates nothing in the nature of the real itself. The related elements of a complex conception, the ways in which we consider now this, now that, aspect of the real, remain external to the real itself. Objective we may call them, if we understand by that only—valid for all finite intelligences to whom experience comes as a compound effect of the relations in which intelligence, itself a real, stands to other realities; but they are subjective in the deeper sense, that in themselves they express only movements of thought, *i.e.*, transitory states of a subject over against and inclusive of whom the realm of reality stands in unchanged, stable, motionless self-identity.

The motives which animate a great thought are always

so numerous, and the value which one assigns to it depends so much on its applicability to special problems, that a brief statement can convey but little of its deepest significance. It must suffice here to draw attention to the main outlines of the conception which Herbart, following the older Eleatic and Atomist thinkers, placed in opposition to the dominant philosophy of his time. For him as for the Eleatics, the real was characterised by changelessness of being, simplicity, and permanence ; but with the Atomists, he admitted multiplicity of being. The real he found in the absolutely simple, positive, specifically qualified essences, to the notion of which he thought we were driven in order to make consistent our empirical conceptions. The real existence which seems to be given in sense-perception, the more complicated experiences of things with qualities, of change, of interaction, seemed to him conceivable, if viewed as resulting from, or expressing, certain relations of the ultimate realities that lie beyond experience. That the real is, we affirm as a necessary supplement to experience ; what the real is, we do not know by direct perception, but we are driven to conceive of such real after the fashion of a simple quality, such as might be given in presentation. Having so determined the real, we have then to discover how, in conformity with its notion, to explain the most general conceptions of experience, the forms of our empirical knowledge, *i.e.*, Space, Matter, Movement, and Time, and finally Experience itself, as a series of states in a subject, which yet claims to have a peculiar relation with the real.

Apart from its general speculative importance, Herbart's view derives much of its interest from the apparent correspondence it maintains with the popular, common-sense, everyday conception of things. It represents one line along which thought, starting from the ordinary practical

mode of regarding the world, is compelled to proceed. We naturally and easily take as initial position the practical conception of ourselves as real, existent subjects, variously affected in consequence of the varying relations in which we stand to other real existences. The *position* or affirmation of reality in any presented content, offers itself naturally as the correlative of self-position, conviction of our own real being. An easy reflection, which doubtless conceals under its simple guise a highly complicated movement of thought, leads us to admit that the nature, the characteristic features of the posited real, cannot be identical with the qualitative content of the experience with which the *position* is connected; but we are just as ready to maintain that nevertheless the *fact* of our experience, the occurring of any presented content, is sufficient warrant for the position in question. We readily allow that the apparent unity of the things, to the conception of which we have accustomed ourselves, need not be absolute; scientific analysis renders familiar the view of apparently simple but really complex effects arising from the combination of simple antecedents; and, still carrying with us our conviction of reality as the substratum, we are willing to regard the varied field of experience as phenomenal result of unknown and unknowable real elements. Our realism easily transfigures itself. And equally simple reflections enable our first conception of things to yield certain provisional characteristics of these real elements. The difference between the fulness of direct sensuous perception and the unfulfilled content of a wish or purpose would be sufficient of itself, were it not confirmed by many similar distinctions, to lead us to the important discrimination between subjective and objective reality and to determine the latter as relatively independent, permanent,

self-existent. Now of these and like reflections the metaphysic of Herbart contains the precise and explicit formulation. Like them, it starts from the conviction of the real nature of the affected subject; admits that the qualitative content of affections must be viewed as dependent on the subject; maintains, however, that the fact of the occurrence of these affections, and the independent ways in which they come and go, are sufficient to justify the retention of our first, primitive belief in reality; and endeavours to give an exact formulation of the results to which reflection on the form of experience must lead. One might ask, with regard to it, whether these results do follow as supposed; or one might ask whether the results themselves satisfy the demands of thought from which they are assumed to have followed. The latter is the line of inquiry followed by Lotze, and, although something may be lost by adopting it to the exclusion of the other, we may here consider the substance of the criticism he offers.

Does the conception of the existent as made up of a multiplicity of ultimate reals, each characterised by the marks of positive quality, simplicity, independence, enable us to understand the world of experience? Does not the attempt to make this conception conform to the demands of thought itself lead, even in Herbart's hands, to such a transformation of it as practically to destroy its peculiar features? One might say here that the Herbartian conception of the real corresponds point for point to his conception of the mental life, and most of the difficulties of the one are the difficulties of the other. There the varied flow of inner experience is viewed as the continuously altering result of the mutual interference of the several isolated *Vorstellungen*, each of which *is* and remains permanently what it is. But it was impossible for Herbart

to avoid just such an alteration of his psychological doctrine as appears to be called for in regard of the metaphysic,—an alteration, as one might briefly express it, from the mechanical conception of a multiplicity of isolated units to the conception of a real altering spiritual life.

Consider, in the first place, the bare demands made in the notion of Being. Sensuous experience may appear to involve the positing, the affirming of a single, isolated, unit of reality; but it does so only if we allow ourselves to make a wholly false abstraction in its regard. The sensuous experience which might be conceived to have as its correlate the posited unit of reality would not be sense-perception as an act of knowing, but an abstract idea of the hypothetical simplest element in the psychical life. Nowhere do we find a sensuous experience which involves the position of an unrelated, absolute, real. The common-sense view of things goes no further than to the assertion that reality somehow *is* and is made known to us through sense-experience, nor does it ever involve the thought of real being as consisting in the absolute unrelated position of real elements. What determines for any element of existence its being is the relations in which it stands. The thought of pure being is, if we look to its genesis, an abstraction; if we look to its content, a mere abstract. Nor does it avail to insist that relations imply related parts, the being of which must therefore be allowed as independent of the relations. Common-sense here is in complete accord with speculative thought. Being is a connected system of which the parts taken in isolation *are* not. And if we allow ourselves to revel in abstractions, to hypostatise, as Herbart does, unconsciously perhaps but not unfrequently, and to speak of these isolated elements as existences which *enter into* relations with one another, we suffer the fate

inevitable on all abstract procedure: we are presented with incompatible features, with a disjunction that is to be united but refuses all combination. The relatedness of being is not an internal accident of being itself; elements which have not relatedness in themselves cannot enter into relations in general.

Herbart, however, had the courage of his opinions. He insisted that relatedness is an external accident of the reals, that the world of true being remains for ever intact, unaffected by change, and that the ground of change, phenomenal change, is not to be sought in any mark of the real itself. But careful analysis of his procedure makes clear to us that an important modification is introduced, and necessarily introduced, into the conception of the real. Phenomenal change we accept as an experience, which, though offering insuperable difficulties to thought, is nevertheless given; and the notions involved in it must somehow be capable of explanation. Herbart's explanation appears at first sight to be merely the more exact interpretation, the translation into metaphysical terms, of the criticism which scientific analysis of the common-sense view easily yields. One readily allows that the phenomenal thing, the complex of attributes united in our apprehension as one thing, exists not as it is at first conceived; that the multiplicity of attributes points to a multiplicity of real antecedents; and that the unity indicates no featureless substance, but merely the identity of one and the same real in varied relations with others. Any given real, A, may be placed in relation to any number of other reals; out of each such relation will emerge, for a spectator who is not directly cognisant of the reals but himself stands in relations, the apprehension that we call a quality or attribute; and popular thought readily accommodates itself

to the admission that the unity of the empirical complex is provisional. Change, in like manner, must be interpreted as the phenomenal indication of the coming and going of real relations. But, having gone so far with Herbart, one is compelled to ask, not only whether more has been done than to express in a vivid way the primary conviction that experience rests upon reality, but whether the new interpretation is compatible with the metaphysical conception of the nature of the real. If the real is to be conceived as a multiplicity of simple unchangeable elements, capable of entering into relations with one another, what, for the reals themselves, is the significance of these relations? It is in vain that Herbart endeavours to retain the two opposing sides of his doctrine. He cannot at once claim for the real elements their characteristic features of unchanging self-identity and find in their varying relations the ground of phenomenal change, substantiality and causality. Even if it be granted that, for a subject that stands as one real among others, varying relations will take form, will find schematic representation in the ways familiar to perceptive experience as alteration, determined sequence of states and of events,—it remains impossible to interpret the nature of these real relations in conformity with the Eleatic view of Being. Herbart himself has another mode of interpretation. Change is not in any one real ; but it may follow from the reciprocal relations of the reals. For these, he thinks, may be legitimately viewed as opposing one another, and as preserving each its own identical being in the midst of opposition. Each real maintains itself against disturbance or suppression from other reals, and in this self-maintenance is to be found the secret of real action. In any one real there may thus be a series of states or conditions, expressing the ways in which it preserves itself over against the other

reals that oppose themselves to it. The elaborate criticism which Lotze offers of this new conception leads directly to the heart of his own view, and it may be briefly summed up as follows. If we preserve our first conceptions of the reals as simple, self-identical posited contents, then opposition or any kind of relation between the reals can only be thought as subjective mode of relating on the part of a conceiving mind, from which there follows no explanation at all of real action. If we desire to explain real action, and so allow that relation of the reals is more than subjective result of comparison—is something in the real world itself—then we must resign our conception of the world of reals as a multiplicity of independent, distinct, self-identical units. It is not that we require to supplement in any way our conception of real action in order to attain this result; we simply require to make plain to ourselves the implication of the thought. He who posits real relatedness must at the same time allow that the independence of the related elements ceases, that they become no longer changeless, permanent centres of relation, but merely the relatively fixed points in one continuously altering system. The unity and self-identity which we demand of the real must be transferred from the hypothetical monads to the whole in which they are members.

Of the substantial soundness of Lotze's criticism no reasonable doubt can be entertained. The same line of thought, though with differing form of expression, lies implicit in Kant and in Hegel. For Kant is practically expressing the same view when he insists that, so long as we attempt to conceive objects as merely logical units, interconnection of them is impossible. Objective relation is only possible in an experience connected together in the unity of a thinking subject. The very gist of Hegel's

philosophy lies in the antithesis to Herbart's conception of the real nature of things as an aggregate of simple, unchanging points of relation. Lotze has his own quarrel with both Kant and Hegel, but it is animated by quite special considerations and is of small importance as compared with his agreement with them on this cardinal point.[1]

That the real cannot be conceived after the fashion of perceived object, but only in the systematic order peculiar to the content of a notion, is a conclusion from which one may rapidly proceed to a statement of Lotze's ultimate metaphysical view. Retaining as he does the opposition between our subjective thinking and reality, Lotze is careful to maintain that the various thoughts by which we gradually correct our first conception of things are not to be taken as themselves constituting the nature of reality, but as the ways in which we construct for ourselves a view that satisfies the problems reflection brings before us. The being of things we cannot reconstruct; we must accept the given fact of existence, and resign the inherently hopeless task of accounting for the fact that anything exists. But since we have seen that the ultimate nature of things is not to be sought in an aggregate of simple qualities, that the *position* characteristic of things is not to be taken as distinct from their content, that change and relatedness belong to the very essence of reality,—we are driven to conclude that the being of things is not a doom thrust upon them from without, is not the result of a union between qualities and an underlying substratum of reality, is not a law external to the cases of its manifestation, but

[1] One of the briefest statements of Lotze on the problem of the nature of real relatedness will be found in the *Grundzüge der Religionsphilosophie*, §§ 14 ff.

can be interpreted only as the ability to act and suffer, only as the position which the so-called thing occupies in a systematic whole of interconnected and mutually determining reality. And, if we push further our attempt to make clear the notion of this interconnected system, we are forced to the conclusion that the absolute independence of things is an erroneous exaggeration of a truth correct enough in its proper place, and that relatedness of things is conceivable only if the so-called things be viewed as members of one fundamental unit or substance, or Absolute.

Philosophy has sought out many forms of expression for the notion to which Lotze, by his own path, thus attains; and, on the whole, criticism of them does but force upon one the extraordinary difficulties which attend any attempt to sum up in one brief formula the content of the most complex thought with which we interpret experience. It is hardly possible to avoid the abstractness attaching to the employment of any one notion as explanatory of a wide and varied complex of facts, and frequent injustice must be done in the criticism of other solutions by overlooking the inevitable narrowness of the notions through which definite formulation of a view has been sought.

It is by closer scrutiny of the conception of real interaction among so-called things that Lotze advances to a more complete determination of the characteristics necessarily involved in the thought of the all-embracing reality. If relations obtain among things, if the thought of reciprocal determination is to be taken as more than a subjective term of comparison, these relations cannot remain external to the things themselves, but must indicate changes, reciprocally determining, in the inner states, the modes of existing, of the things themselves. That this should be so, is but a special application of the thought which Lotze throughout

insists upon, the thought of reality as no mechanical compound of matter and form, but as itself the living, developing whole. If, further — recalling the conclusion reached, that the independence of things is but an abstraction of our own thinking, and that the possibility of a reciprocal determination of inner states exists in the unity of the real in which all such states are—we ask what mode of existence we can ascribe to the absolute real attained, we have simply to consider what insight we possess into the possibility of a union, a real union, of manifold states in one being. With Leibniz, Lotze answers, there is given one, and there is only given one, instance of such *unitas in varietate:* spirit or mind. We can only conceive of the absolute, the uniting bond of the varied states of so-called things, after the fashion of spirit or mind. Reality, in the full sense, is only for the unit conscious of its own unity in multiplicity. Doubtless such a conclusion raises many special problems, but it furnishes the sole comprehensive answer to those more abstract inquiries that fall within the scope of Ontology.

It is not possible to do more than indicate in the briefest fashion the nature of the discussions which fall under the remaining rubrics of the *Metaphysic.* Generally, the purport of these may be said to be the attempt to show that the forms of experience, more or less complex, which at first glance appear more particularly to connect themselves with the realist view of the universe, are susceptible of as exact and more profound interpretation on the idealist hypothesis. For example, the reality of space, which is a necessity for the realist view in one fashion or another, whether in the crude fashion of naturalist speculation or in the finer metaphysic of Herbart, may retain all its significance when interpreted as signifying merely that in the

nature of the inter-related activities of so-called things are involved features which are capable of apprehension by us only in the fashion of the space-schema. Space is thus a mode of intuition, or rather a mode of the intuited: for its relations appear in the content of the apprehension, not in the mode of apprehending. Time, in like manner, must be conceived not as something external to the real life of the one absolute being, but as the mode in which, in the experience of the finite spirit, the orderly connection and continuous development of reality is apprehended. There is in the chapter of Time, and in the treatment of the same point in the *Grundzüge der Metaphysik* and *Grundzüge der Religionsphilosophie*, much matter that would deserve careful and detailed handling. Of special interest, in my opinion, is the manner in which Lotze has to connect with the metaphysical difficulties of the notion of Time the psychological problems that arise from consideration of memory and of the limit of simultaneous consciousness.

The further the Cosmological speculations are pushed, the more nearly do they approach a question familiar to British philosophy. When space has been interpreted as a mode of intuition, when a reading in terms of conscious experience has been attempted in regard to the fundamental characteristics of matter, when the independent existence of so-called things has been denied,—the question naturally arises, Are things and their relations more than the orderly experience of finite minds? Is there no existence in the universe of reality save the conscious experience of minds? Unfortunately the answer to such a question has too often been attempted with the aid of notions altogether inadequate to it, and with an almost total forgetfulness of the true metaphysical significance of the question. One cannot but feel sympathy with Herbart in his indignation at subjective

idealism ; for if ever there was an empty formula, parading itself as full of meaning and value, it is the fancied philosophical truth that since all that we know is in self-conscious experience, our varied presentations and representations compose the total of reality.

It is a prejudice, though an inveterate prejudice, that the spiritual, inner life has no other function than to reflect in fashion of a mirror a real world, complete in existence and function independently of mind. The contrast that obtains under any metaphysical conception between the larger life of the whole and the inner modes of being and acting which make up the individual's self-consciousness, is too readily interpreted as a contrast between two radically unlike phases of being ; and the simple truth that the being of even the hypothetically assumed *thing* is not identical with the phase of individual thought in which it is directly apprehended or indirectly represented, is taken to mean that the being of things is complete and absolute apart from the spiritual realm of self-conscious mind, that existence breaks up into two unlike spheres. But we rob the thing in no way of its *reality* for all the practical ends of life (and these for the most part determine our conception of reality) when, on purely ontological grounds, we deny to it self-existence and independence, and interpret it as but a form of the process through which the absolute, itself spiritual in nature, takes expression. Just as little need we hesitate to say, on grounds more psychological, that things are not in the fulness of their being save when forming, with and in relation to the inner life of self-conscious minds, parts of that to which we can assign reality of existence. Things are not modes of apprehension of finite minds ; the external world is no spectral illusion or projection of individual minds ; but the existence of things, of an external world, is

not a summed up, completed fact, apart from the existence and thought of finite minds. We must interpret the world as one whole, not as an incoherent juxtaposition of opposed parts. A world in which there is an inner life, directly and immediately given, cannot be interpreted after the realist fashion, whether in its crude or more refined form. And here, one may be permitted to say, lies the oversight in the quasi-metaphysical schemes that have been based on modern scientific conceptions. We need not only the most exact and complete history of the ways in which the real course of things has proceeded, but to interpret the whole in the light, not of what is lowest, least independent in it, but of what is highest, most complete in being.

It is but a step from this conclusion to a new series of thoughts which Lotze, wrongly one may think, does not specifically include under Metaphysic. In accordance with his stubborn antagonism to the term Thought, Lotze, insisting that the function of thought is but formal, finds in the concrete life of spiritual activity, as contrasted with the cold, colourless mechanism of thought, the vehicle through which the real existence of things is brought down to us. It is Experience in the largest sense of that vague term—real apprehension, feeling, and acting—that gives us a place among things and indeed makes these things to be for us. And in this concrete life, there are features, feelings and estimates of worth, of which the pure contemplation of the world by thought could give us no inkling, but which force upon us a new and larger interpretation of the sum total of things. In fact, Lotze arrives by his own path at the point long before reached by Kant in the *Kritik der Urtheilskraft*, and like Kant, though with more modern phraseology, offers a final reading of the universe in terms of ethical idealism. Things are, not

merely in order to be the parts of a mechanism, but as the instruments whereby the ultimate good is wrought out; our knowledge has objective value because it brings before us no mere purposeless play of phenomena, but gives us a world the interconnections of which are subordinated to the final and sole reality in it, the Good. Of the manner in which Lotze handles the difficult problems raised by these thoughts, nothing need here be said, for Lotze has himself with his usual caution excluded the treatment from Metaphysic proper. The ninth book of the *Mikrokosmus* and the *Grundzüge der Religionsphilosophie* contain his most matured expressions.

A notice like the present can convey but a very imperfect idea of so complicated a work as the *Metaphysic*. There exists in the English language no other work at all resembling it, and one may hope for good results from its appearance among us. Very sincere gratitude is due to the translators, who seem to have executed their difficult task with the most conscientious care and with a high measure of success. Our stubborn tongue does not lend itself readily to the expression of subtle thoughts, and at times the sentences of the translation have a Teutonic awkwardness, but on the whole the book appears to me by far the most successful of the unfortunately few translations we possess of German philosophical works. The editor, Mr Bosanquet, is to be congratulated on the successful termination of what must have been difficult and delicate work.

IV

MR BRADLEY'S LOGIC[1]

MR BRADLEY'S work comes very opportunely. It is a characteristic feature of much of the best philosophical work of the present time that it consists in the main of revision of fundamental principles. A period of eminently constructive work lies behind us, and it is not impossible that much of the present stir may signify only the process of coming to understand what has been done. But it is true now, as at all times, that a philosophic view is only to be attained from one's own position, and that a comprehensive philosophic method can only become living and fruitful if it connects itself and is penetrated with the thoughts of the present. There is no simple tradition in philosophy, and, if a method or system is accepted, the ground must lie in the fact that its leading idea has proved itself capable of expanding so as to cover the new aspects under which the perennial problems have appeared.

It is but natural that the process of scrutinising first principles and testing them by application to the great body of questions that has always formed the material of philosophy should appear, when regarded from a somewhat external point of view, like a chaos of disjointed and

[1] *Mind*, January 1884.—A critical notice of *The Principles of Logic*, by F. H. Bradley (London, 1883).

mutually opposing tendencies. Certainly the present state of the study of Logic has this appearance. If one takes only the representative English writings in that department, one cannot but be struck by the apparently boundless diversity of view in regard to every matter of fundamental importance. Province and method of the science, auxiliary principles with which to make the approach to logical doctrines, theory of the doctrines themselves—in no one of these points is there anything like an established view, a common basis. It is not many years since one might have said that, on the whole, putting aside the merely historical teaching of what is erroneously entitled the Aristotelian logic, English writing on the subject might have been fairly distributed under two main heads : on the one hand, a purely formal logic, basing itself, though perhaps unwittingly, on an extremely imperfect psychology, supporting itself by appeal to the high authority of Kant, and claiming to have effected, if at a cost of rejecting the most interesting questions, a purification and scientific limitation of the sphere of logical discussions ; on the other hand, a general theory of knowledge, likewise involving much disputable psychology, but rightly claiming to represent more truthfully than its rival the actual process of thought as exemplified in scientific work, and so extending its boundaries as to be able only by arbitrary refusal to reject the deeper questions inevitably raised by any discussion of the nature of knowledge. In a multiplicity of ways, complete dissolution of the one, and partial dissolution of the other of these apparently compact doctrines has been brought about, and now the state of Logic is like that of Israel under the Judges : every man doeth that which is right in his own eyes. Even when a writer is aware that fundamental difficulties lie in the way of the view upon which he is

proceeding, he claims the right to act as did the prudent divine, to look the difficulty in the face and pass on. The reader is perplexed by continual references to a distinction between logical and non-logical, a very phantom on which he can lay no hold, but which in some strange fashion appears to regulate his author's proceedings and to extricate him when any formidable danger is at hand. Each *Logic* presents some new arrangement of material, some fresh classification of notions, judgments, and the like, some novel way of getting over an old familiar stile, but it is rare indeed that in any such treatment a really vigorous effort is made to show the grounds for all that is advanced and so allow the reader to form what our German friends call an objective opinion.

Affairs are no better, perhaps to some they may appear worse, among the German logicians. In that speculative domain, *Logics* swarm as bees in spring-time. Many of them, it is true, do not aspire to more than merely academic honours ; they are text-books from which the reader may learn a little, and by which he may to some extent be disciplined in thinking. But, these apart, there have been supplied by German writers within the last few years quite half a dozen treatises of a much higher order, comprehensive, elaborate, based on principles of some sort, and each giving an altogether individual and new reading of the fundamental logical processes. He who endeavours to extract from the *Logics* of Lotze, Sigwart, Bergmann, Schuppe—even if he does not extend consideration to the somewhat earlier but yet living works of Ulrici, Trendelenburg, and Ueberweg—a systematic representation of logical doctrines, has before him a task to which the labours of Hercules were simple. He will doubtless be able to discover that in some fashion all are treating of the same fact, whether it

be described as thought or knowledge ; more of agreement than this he will hardly find. In the mass and in detail, each treatment pursues its own way, and supports itself by a more or less explicit reference to something else, whether psychology, or metaphysics, or common-sense, or philology, or anthropology, or what not. Classifications and distinctions are introduced, on grounds sufficient or insufficent but invariably diverse, and thus, in so cardinal a matter as the distribution of the forms of judgment, we are presented not only with such rearrangement of the comparatively familiar types as indicates a novel point of view, but with a variety of new forms, substantial and accidental, descriptive and explanatory, substitutive, co-ordinative, subsumptive, &c., the number of which seems practically indefinite, and to be determined merely by the extent to which current modes of speech have been taken into consideration by the writer. The limits of the subject as a whole are equally indeterminate. Inquiries rejected by some are admitted and treated as fundamental by others ; the ground of rejection or inclusion appearing really to be whether or not the writer has handled elsewhere or proposes to handle elsewhere these problems.

Chaotic as are the phenomena on which an opinion with respect to Logic has to be based, the general character of that opinion can hardly be matter of doubt. This turmoil of conflicting views is a most hopeful sign. For it indicates that we are beginning to form a logic which shall in some way represent the laws and methods of our thought, and that the stage of preparation, the attainment of some more precise conception of what is truly the function of thought, has been reached. We have, one would trust for ever, given up the conception of thought as a mere formal activity, dissevered from the body of that which makes up

our knowledge, indifferent to content, and obeying only the law of one and two, of Identity and Difference. Probably no theory of thought has ever been so empty and so destructive of genuine thinking as the Formal Logic, miscalled Kantian, which endeavoured to proceed upon that basis. Really, that logic, taken strictly, must resolve its whole contents into one simple practical maxim : " Let thinking be consistent with itself." Whatsoever else it contains must come from without, in the shape of psychological propositions regarding the elements of thinking, or metaphysical assumptions regarding the conditions of what is thought. But, though we are perhaps able to see how futile is the purely formal logic of thought, there is sufficient evidence supplied by our current logical works that we have not yet succeeded in marking off logical discussions proper from general psychology or grammar or merely popular thinking. Even where the view is taken that Logic is a real theory of knowledge, an attempt to unfold completely the processes and laws by which knowledge is formed and systematised, there is an almost constant confusion between the psychological and the logical analysis of knowledge. Knowledge being confessedly a subjective affair, a matter of mind, it is instantly assumed that the same predicates which apply to facts of mind regarded as such are to be found and are operative as logical peculiarities. The doctrine of notions, *e.g.*, tends to become a mere receptacle for psychological discussions regarding the modes of forming ideas, their kinds and the properties of each class—subjects no doubt of psychological interest, but not truly involved in the logical inquiry. The doctrine of judgment is confused by having imported into it a whole mass of disputable matter regarding the nature of belief, or conviction of reality; and theories of the judgment, which are almost as numerous as

treatises on Logic, turn for the most part on psychological differences. Only a vigorous effort to determine generally the fundamental characteristics of the points of view from which Logic and Psychology respectively contemplate knowledge, or a detailed criticism of the several doctrines with this general aim in view, can aid us in coming to a really fruitful decision as to the function and scope of logical science.

It is as making a large and powerful contribution towards this end that one hails Mr Bradley's work. He does not profess to work out in systematic completeness a doctrine of logic; but, partly by polemical discussion of views, partly by presentation of results based on a more sound and penetrating analysis of the function of thought, he has not only cleared the way of much that for long has been an almost insuperable obstacle, but has also drawn attention to the real nature of logical problems and raised the discussion of them to a platform indefinitely higher than that occupied by our current logical thinking. His work is not one of which it is easy to give any brief and connected account, and the difficulties of a reviewer are somewhat aggravated by the peculiarities of the author's style and method. In a matter of this kind, no doubt, much must depend on the individual's turn of thinking; but I should fear that some part of the good effect that ought to be produced by Mr Bradley's work will not be realised because the reader will fail to seize the leading idea of the whole. The discussion grows in complexity as it is developed, and partial views are taken up into and superseded by the more comprehensive solutions. But there is throughout implied a method of regarding the whole business of thought that is not brought with sufficient clearness to the front, and the point of many isolated treatments may in consequence be missed. Mr Bradley has chosen his own way, and has

worked towards a theory of judgment and inference, by taking up, comparing, setting against the current teaching, and carefully sifting empirically selected types of judgments and reasonings. Such a method has its advantages for teaching purposes, but it is apt to mislead unless the underlying principles which guide the whole discussion are clearly discerned. Mr Bradley hardly brings these forward into sufficient prominence, though he might well have done so, and it requires a long-breathed reader to accompany him through his devious course. Perhaps this one complaint may connect itself with the remark in Mr Bradley's preface that critics of different tendencies may object that the treatment contains too much or too little metaphysics. I cannot think that Logic as a whole is in any way independent of Metaphysics, though I fully admit that, as metaphysics covers a multitude of problems, it is not necessary that into every section all the rest should be dragged; nor do I imagine that the occasional distinctions drawn by Mr Bradley between logic and metaphysics indicate a contrary opinion. What is alone of importance is the ultimate view of reality and thought, which is common to all such problems and binds logic and metaphysics into a unity. I do not find that Mr Bradley makes the view on which he proceeds clear, and it appears to me that the force of many of the discussions, in particular that with which the book closes, on the validity of inference, is weakened by the want of some definite statement.

Mr Bradley begins his inquiry with the treatment of the central problem of logical theory, the significance or import of the Judgment, and to this the whole of Book I is devoted. Book II begins the discussion of Inference, and in its first part, expounds certain general types and principles of reasoning as substitute for the rejected syllo-

gism. The second part of the book is entirely critical, and is devoted to an examination of the doctrine of Association with its natural sequels, the idea of reasoning from particulars and the Inductive methods, and to an appreciative though hostile review of Jevons's Equational Logic. Book III resumes the discussion of Inference, brings forward in the first part the main processes in which the essential characteristics of inference are to be detected, and endeavours to reduce these to their most general expression, and in the second part handles the ultimate problem, foreshadowed throughout all the discussion, of the relation between logical truth and real, objective connection. The work, it will be seen, is at once comprehensive and has a certain systematic idea in it. Apart from the main inquiry, moreover, it abounds in good thinking, and no reader can fail to derive benefit from the acuteness with which isolated questions of psychological or metaphysical interest are handled. In truth, one is somewhat embarrassed with Mr Bradley's riches, and would feel inclined at times to wish that he had pruned his work more closely. A little dissatisfaction is inevitable when a promising problem is only hinted at, even though the glance given be one of undeniable acuteness. The frequency with which Mr Bradley is compelled to make brief excursions into psychology and what he chooses to call metaphysics, and the importance of the relative matters, lead us to desire that he had substituted for much occasional disquisition one serious and careful statement of the way in which he regards thought as subject of psychological, logical, and metaphysical treatment respectively. Such a statement is called for, not only in order to illumine his own results, but also as furnishing some guiding thread to his criticism of other views.

Naturally, it is in the theory of Judgment that a logician's fundamental point of view comes to the front, and the judgment is here handled with great elaboration and much subtlety. Experience must have taught every one who has made the attempt how difficult it is to express in other language the results a thinker has come to on a question of the greatest complexity; and I can hardly hope to have succeeded in adequately apprehending all that enters into Mr Bradley's view of what constitutes a judgment. So far, however, as I can determine, his opinions would be somewhat as follows. Judgment is clearly a mental function, that is to say, it can only be understood as part of the complex in which thought and reality stand as opposed to, yet depending on, one another. But as a mental function, judgment is not to be taken as having the characteristics of a mental fact. However valuable may be the results of a psychological investigation of judgment as a fact in the mental life, however much light may be indirectly thrown on its logical nature by tracing the history and conditions of its appearance, the judgment as an element of knowledge, as the very mode of apprehending the real, is not simply a psychical fact, nor can the logical theory of judgment admit any determination of either idea or reality as these are treated for psychology. The constituents of the judgment, idea and reality, are equally necessary and require special definition. The idea is not the mental fact, taken as such; it is part of the general content of the real as apprehended, separated off, fixed and used as a sign or symbol. Relatively to the real, which is substantival, the idea is adjectival. It is known as not itself the real, but it has significance, meaning; and this meaning is definitely referred to the real. In any judgment the idea or ideal content is connected with,

attached to, the real, and the new relation resulting is perceived not to be made by the act of judging but to be independent thereof.

This highly general description of judgment can hardly be quite intelligible until it has received filling-in from contrast with opposed views and from consideration of the new features which complex experience introduces into it. But the view deserves warm recognition as an attempt to see through the thick veils of current doctrine and to seize the very essence of the act of judging. I do not know how far Mr Bradley's illustrations and explanations of the term *idea* will throw light upon the meaning in which it is to be employed; for there is danger, despite his precautions, that the matter will be viewed psychologically; and this danger is perhaps aggravated by the attempt to give a genetic account of the way in which we may suppose judgment to have come about in a developing intelligence. There is a correlative danger, attaching to the term *reality*, on which a word will be said later. What one would desire to insist more strongly upon, is the essential conjunction of the two factors, reality and idea, in judgment, and the impossibility of taking these apart from one another. Popular thinking and psychological considerations tend constantly towards a contrast which is fatal to any theory of thought; and the employment of the term *idea* at all emphasises the contrast in a most hurtful manner.

Provisional acceptance of the general description of judgment enables Mr Bradley to deal summarily with certain definitions of judgment, which err either by abstractly isolating the factors of the judgment or by accepting part for the whole. Such, *e.g.*, are all definitions of judgment as comparison of ideas, under which fall the current explanations of judging as referring to a class,

as asserting identity of subject and predicate, or definitions which are merely adequate or inadequate psychological theorems. The criticisms here are to the point and felicitously expressed.

The discussion of the more abstruse questions regarding the judgment is led up to from the familiar doctrine that, in a categorical judgment, existence of either subject or predicate is not asserted. "All S is P" by no means forces the assertor to the admission that either S or P exists. S and P are merely ideal contents, and the judgment is no more than the statement that these are so connected that if the one, then the other as qualified by the first. Difficulties of this kind have recently begun to find their way into our current logical discussions, not without most hopeful results.[1] Clearly, if a solution is to come at all, and is to affect our distribution of logical judgments, it must be arrived at by a more profound consideration of the reference to reality that has appeared as a constituent of the judgment. Mr Bradley advances to the task by contrasting in a general way the characteristics of reality and truth. The real is individual, self-existent, substantival. Truth on the other hand, as having to do with the idea, has no one of these characteristics. At first sight, then, it would seem that all truth is hypothetical merely, that it expresses only well or ill founded connections of ideal contents in our minds. To come closer to the problem, there is introduced a provisional classification of categorical assertions, into (1) analytic judgments of sense, in which the given is merely

[1] See, *e.g.*, Mr Venn in *Symbolic Logic*, and Mr A. Sidgwick's very thoughtful treatment of Abstract and Concrete Propositions in *Fallacies*.

described by one of its parts, (2) synthetic judgments of sense, in which the real of sense-perception, involved in the assertion, transcends what is immediately given, (3) those in which the real referred to is not a fact of perception. Scrutiny of these yields as result the important principles, that the real, even when taken in the sense of the real in perception, is not identical with its momentary appearance in perception, said momentary appearance, indeed, being an incognisable atom when taken in isolation; that the real, taken in more or less limited fashion, is ideally determined and directly referred to in the analytic judgments; that the real is indirectly referred to in synthetic judgments and is in them taken to be a continuous identity underlying the momentary phenomenal appearance. All such judgments are singular and appear to be categorical, to imply assertion of the real and of its elements as appearing in the judgment. Universal abstract judgments and hypotheticals, on the other hand, appear to assert merely necessary connection of ideal content, and therefore point only to that in the real which is the ground of the consequence necessarily following. In the judgment, "If S, then P," we only assert that if the real be qualified as S, then it will present also the qualification P; we do not assert that the real is either S or P.

But to rest content with such a view is to do grave injustice to the function of thought and to take an extremely imperfect and abstract aspect of the real as the whole of its significance. In the concluding sections of his second chapter Mr Bradley advances towards a completer doctrine of the kinds of propositions. He has little trouble in showing that synthetic judgments of sense, which transcend the given, proceed on a principle not distinguishable

from that which characterises the hypothetical, while analytic judgments of sense, though professing to give the real, do so only by a process of mutilation that is concealed by ordinary language but is fatal to their claims as absolutely and simply true. The terms of which the singular analytic judgment consists are universal, are wholly inadequate to express the concrete reality that is assumed. Such judgments are in fact the poorest and most abstract, giving the least expression of reality. Like all other judgments they do refer to reality, but they refer in the least definite, most hypothetical fashion. Abstract judgments, though on one side to be described as hypothetical, for they do not assert the existence of their elements, are on another side categorical, for they do imply a quality of the real and express the nature of the real as the realm of law, of systematic connection of facts.

The negative judgment (ch. iii), Mr Bradley regards as resting essentially on the recognised exclusion by the real of a suggested ideal determination. It implies, therefore, in all cases a recognised ground of exclusion, a positive element, though the nature of this ground need not be the same in all cases of negation. It is with satisfaction that one sees the blank form Not-A assigned to its true place (pp. 118-9, *cf.* pp. 147-8), but the whole tenor of this chapter and occasional special statements (pp. 109, 116) tend rather strongly towards the purely subjective interpretation of judgment which is the gulf always yawning beside the logician. The disjunctive judgment (ch. iv) is shown to involve a categorical assertion regarding the disparate members of a whole predicate, a hypothetical determination of the subject in reference to these disparates, and a general assumption or inference regarding the totality of the sphere which is divided.

Chapter v, on the Principles of Identity, Contradiction, Excluded Middle, and Double Negation, is perhaps one of the least satisfactory, not because there is much in it from which one would dissent, but because it does not seem possible to discuss with any profit these principles from the point of view which the author is taking. If we regard judging as part of the subjective process of knowing, these principles have only relative significance. In their abstract and general form they can only be handled in what we think Mr Bradley would call metaphysics. Not much is to be gained by treating truth in isolation, and so rendering the Law of Identity, *e.g.*, as that it merely expresses the abstractness of truth (p. 133), and, similarly, the dialectic method requires not to be compared with Contradiction and Excluded Middle when these are taken from the same point of view.

Chapters vi and vii, on Quantity and Modality, raise a multiplicity of questions. Want of space prevents my doing more than call attention to the excellent treatment of the general basis of probable reasoning which is given in ch. vii ; to a general statement of the chapter I shall have occasion later to refer. The treatment of quantity raises two problems—first, that of extension and intension, second, that of the meaning to be assigned to universal and particular. In respect to both, the ordinary logic has accepted partial doctrines either from uncritical experience or from psychology, and Mr Bradley's review, though probably not final, does good service in pointing out the unspeakable confusion that prevails regarding them. In his treatment Mr Bradley is led to fall foul of two familiar doctrines, the one that some names are non-connotative, the other that extensions and intensions vary inversely. There is no doubt that the word " connotation "

has crept into logic without being able to yield a very satisfactory account of itself, and the modern use of it, dating doubtless from Mill's *Logic*, is entirely at variance with its earlier acceptation. From some points of view the distinction indicated by it becomes comparatively worthless; but I do not know that there is not a positive advantage in having a word which shall indicate the specific property of a sign when used to designate a class. The matter is mainly grammatical, not logical; but I do not think that it is at all necessary to identify connotation with *signification*, and so, because all signs have signification, to assert that they all have connotation. In like manner the doctrine of inverse relation between extension and intension has doubtless been applied in a wholly absurd and senseless fashion; but I imagine that in the long run the meaning of the doctrine will be found to rest on the peculiar relation between genus and species, and to result from taking abstractly a truth which would have a different expression when all the elements are taken together.

The current doctrine regarding extension and comprehension in judgments, if indeed there is any one doctrine on the subject, is sufficiently confused; and it seems hardly worth while to contrast with it in detail a new reading of these distinctions. If the definition of judgment adopted by Mr Bradley be carried out, and the subject be taken not as the grammatical subject which appears in the verbal statement, but as the ultimate reality, then it is easily seen that, as implying ideal content, the judgment may be read in comprehension, while, as referring to the real, it may be read in extension. The distinction is hardly worth retaining. So the current doctrine of the quantity of propositions can be shown to rest on little more than grammatical peculiarities of verbal expressions, and critics have had

little trouble in collecting empirical expressions which by no ingenuity can find reasonable explanation within that doctrine. Even in recent treatises the attempt to remodel the current teaching on quantity has hardly gone further than the introduction of distinctions between law and instance, abstract universality and concrete particularity, which are far from exhausting the matter. It is interesting to note the manner in which Mr Bradley is driven to what he has called specially metaphysical determinations in order to effect an explanation of quantitative differences. Ideal content he appears to take as in itself universal: it has no quantitative determinations in it; but such content is only one element in the judgment. The real which is the correlative factor is shown to contain in itself the mutually determining features of abstract universality and abstract particularity, and to have therefore in its individual character the aspects of the universal—the identity of differences,—and of the particular—the differences of this identity. The real is thus concrete, and may appear as either concrete universal, or concrete particular, or the individual which is the truth of both. And the ideal content is at once seen to be an abstract, just as worthless as the assumed atomic, ultimate, undetermined real. This is a most important result; it affects the whole doctrine of judgment, and enables us to see that the judgment is nothing but the way in which the elements of the only reality, the thing which is known or has its notion, are held apart from one another so that their mutual implication becomes apparent. If we please we may express this in a subjective fashion, and think of the process as that in which the real is determined by some idea in us; but such a translation is dangerous, as in all probability leading to an opposition of real and ideal which can have no place in the judgment

per se. We may ask, and the question appears at the close of Mr Bradley's work, what signifies this fundamental form of consciousness, the reference of knowledge to reality? how comes it that in our judging and reasoning we should at once seem to be merely reproducing in ideal fashion a reality that is completely given, and at the same time supplying intelligible shape and substance for a matter that is relatively abstract and undetermined? But we must be careful not to prejudge the answer by introducing into our very notion of the judgment a reference to the abstract subject. That in the mental development of the concrete spirit judgment does come about through the opposition of perceptions, representations, and the like, is a fact with which Logic does not require to concern itself.

In his Second Book Mr Bradley passes to the consideration of Reasoning. Part of the book is occupied with a polemical review of the theory of knowledge that has sprung from the psychological doctrine of Association of Ideas. With respect to this part I can only say here that I think Mr Bradley most successful in his criticism, and that the chapter on Association is a valuable contribution towards a sounder psychology. The chapter on the Inductive Methods sums up, from a higher point of view than has generally been taken, the difficulties which most serious critics of Mill's *Logic* have felt in their regard. I am glad to find that Mr Bradley takes a view which I have more than once expressed, that a false prominence has been attached to these methods as parts of the general doctrine of Inference supported by Mill. The chapter on Equational Logic is acute and ingenious. I imagine that the ground of Mr Bradley's strongly expressed approval of a doctrine deviating so widely from his own is the conviction that the Equational Logic avoids at all events the numberless

psychological abstractions of the ordinary and empirical logic, and that it does make a vigorous effort to describe the modes in which we deal with the real in knowledge.

The Third Book continues the analysis of Reasoning and leads up to the final logical problems. I am well aware that no brief abstract can give a fair idea of the merits of the prolonged treatment of inference which is contained in these books, and that any attempt to compress the author's results simply casts into the shade the most interesting and instructive part of his work. The nature and forms of inference are handled with unwearied patience; such parts of the current logic as specially concern themselves with the foundation of the process are sifted and examined with minute and sometimes exhausting care; incidental problems receive brief and generally luminous discussion. A brief statement, moreover, must do injustice to the individuality of Mr Bradley's method, which is such as, I think, will cause trouble to many of his readers. Mr Bradley begins with a general view of inference which is later on altered in accordance with the distinctions arrived at in the course of the discussion. Regarding inferences as a process in which a new truth is reached from something accepted, he more formally translates these popular terms into the statement that an inference is an ideal construction resulting in the perception of a new connection. A conclusion, as such, is not something merely given; it is reached. The accepted data are not isolated elements standing apart from the conclusion. In the process they are looked at, placed together, put in a relation to one another, ideally experimented on, and the result is a new relation perceived or the perception of a new relation. This general statement and the empirical examples which cohere with it lead to a very vehement polemic against our ancient friend the

Syllogism. Mr Bradley's grounds of quarrel are varied. He denies that schemata, general forms of valid inference, can be laid down: we can indicate only the general heads of relation within which by ideal experiment a new relation can be reached; we can indicate only the general principle which guarantees the possibility inferring under each category. Let the category, for example, be that of synthesis in space, as when I say "A is to the right of B, and B is to the right of C"; then there can be indicated generally what kind of conclusion can be drawn and the principle of connection on which the ideal experiment proceeds. The actual conclusion is perceived, seen to follow, and is not drawn by any rigid syllogistic process. Again, the syllogism has insisted on a major premiss, has viewed inference as being procedure by subsumption of a less under a more general. Not only is this hard to reconcile with the notion of inference as giving a new relation; not only is it quite out of keeping with the kinds of reasoning that occur constantly in experience, *e.g.*, mathematical construction and the like; but it altogether misconceives the relation between a principle of reasoning and the reasoning itself. A principle is not a general model or axiom by reference to which we reason; reasoning is a function which embodies a principle, is its living exponent. The two are not to be severed as they are in syllogism.

Dismissing, thus, the syllogism—and I think that, as that form is commonly expressed, we should agree in doing so, though perhaps with milder language—Mr Bradley notes the main principles which underlie his types of reasoning. These are identity within the elements of the ideal experiment and universality of one premiss—different aspects of the same. This identity, as previously in the case of the so-called law of thought, is taken with a genuine meta-

physical significance, but here with a possibly misleading stress laid on the subjective side. The ground of reasoning, it is said, is the assumed real identity of that which is identical in ideal content; by which one might well understand the empty identity of the syllogistic form, that the middle term shall be the *same*. But we cannot take "ideal content" in this abstract sense, or regard it as in any way conditioned by the subjective process of thinking. It is significance or meaning, the real viewed in its essential character for thought as the union of universal and particular. The notion of correspondence between ideal content and reality is ambiguous and can only lead to a quite contradictory result. On this ground I am altogether disinclined to accept, in lieu of the syllogism, as necessarily arising out of judgment, the subjective processes of construction and the like on which Mr Bradley expands himself. Nor do I follow him in his criticism of the syllogistic form as fallaciously attempting to draw a conclusion which must be left to the private judgment of the individual thinker. No doubt, the ordinary mode of expressing the syllogism—through concrete instances—is deeply in fault; no doubt, also, the class-idea on which the syllogism is made to turn is a veritable abstraction which cannot be regarded as the life of reasoning. But the concrete inferences, which are supposed to show the incompetence of syllogistic form and to be products of ideal experimentations, do in themselves involve the fundamental catogories of universal, particular, and individual, of whose connection the syllogism is but the form. That from these categories taken *in abstracto* inferences in concrete matter can be drawn is of course false; but it does not seem at all needful, in order to rescue the syllogism from oblivion, to insist that concrete thinking involves nothing more than these abstract categories. To

reject the syllogism and to lay all stress upon these processes—construction, comparison, abstraction, and the like—is to tend towards a purely subjective reading of thought, and to interpret the real as a kind of unknowable, foreign to thought, and only assumed, on grounds good or bad, to conform in some way to it.

With much care and elaboration Mr Bradley in his Third Book works out the forms in which as it seems to him inference really proceeds, finally bringing them under the two rubrics Analysis and Synthesis, with indication of a third process (perhaps System) at the root of which lies the ultimate idea of the real as concrete individuality, unfolding itself in its peculiar forms into all the richness of existence. Such third process, which perhaps connects itself with the class of judgments not expressly handled, those in which the subject is non-phenomenal reality, is but hinted at, and the problem raised by it is treated in the concluding chapters from a narrower point of view. Briefly, the question there raised is that of the validity of inference—a many-sided question, the mere formulation of which in its true terms is philosophy at large. Mr Bradley approaches it from various sides, discussing the relation of ground of knowledge to ground of existence, of formal validity to real truth, and finally of knowing as a whole to fact known. The difficulty, which no one will be more ready to acknowledge than Mr Bradley himself, of coming to a perfect understanding with regard to the significance of the terms employed in so abstruse a discussion, and the dependence of any meaning on a more or less developed philosophic view, render it impossible to do more than remark on one or two of the aspects of the treatment here given. Mr Bradley refers in his discussion to Lotze; and most readers of the *Logik* will remember the

stringent criticism to which the claims of logical forms to real validity are subjected. But, at the same time, it ought not to be forgotten that such criticism rested on a metaphysical basis, on a theory of the soul and of psychical life, which rendered it absolutely necessary to regard logical forms as being mere products of the psychological mechanism *under certain presuppositions*. The whole difficulty which rises out of the very term "truth" was simply cast back into the undetermined field of assumptions; for by these assumptions only can "reality" have a significance for us. To follow in this track is to play with the term "reality" and to be driven in the long run to the *caput mortuum* of the "thing-in-itself." I do not imagine that Mr Bradley takes this track,—there is much in his book that so would be incomprehensible; but he undoubtedly speaks as if the nature of thought were such as to render reality altogether foreign to it, and sometimes treats phenomenal reality, momentary appearance, as if it had supreme worth and supplied a touchstone for the validity of reasoning. Knowledge is subjective, unquestionably, and it is not reality, simply because it is knowledge; but it is not on that account to be regarded either as a complex, accidental growth in the individual spirit, or as doomed for ever to face its own insoluble problem. If we seriously treat knowledge as one of the modes of thought in and for which reality has any significance, we may come to see why there is continuously present therein the opposition of knowing and being, which, hastily interpreted and mixed with foreign considerations, might lead to an abstract severance of the two. Possibly, also, those minor queries, such as that relating to the cause and the reason in knowledge, would yield to an investigation of the true significance of the relative categories employed.

I am in doubt to what extent these remarks do injustice to Mr Bradley's point of view; but the definition he has given of judgment, his interpretation of the modal categories, his development of the forms of inference, his frequent excursions into the psychology of knowledge, and his final discussion of reality, seem to me to imply a view hardly in keeping with the general tenor of the book, and possibly, if worked out, destructive to much that appears there. However that may be, there is this to be said, that from few books of recent philosophy is there more to be learned than from the present work. No reader can fail to learn much or to be stimulated in the best way by the abundant criticism that is bestowed upon logical and psychological doctrines; there is none who cannot benefit by the remarkable patience, circumspection, and acuteness with which the author handles each logical question. That a work should be calculated to raise the whole standard of discussion in its subject is perhaps the highest praise that can be given; in my judgment such praise can be unreservedly accorded to Mr Bradley's treatment of the Principles of Logic.

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