CHAPTER II

THE PROBLEM OF KNOWLEDGE

I

Not only psychological understanding but, in general, all understanding is conditioned by the relation between continuity and discontinuity. The latter occasions the fulness and multiplicity of the content of the understanding, the former its connection and arrangement. Our understanding of things appears under different leading forms which correspond to the sciences.

I understand what something is if I recall it; thus I understand or know who is approaching, if I recall the person approaching. Recollection rests on the connection existing between the new and the old experiences. In the act of recollection, all intervening
experiences are forced to one side and the new phenomenon is directly or indirectly, involuntarily or after some reflection, identified with an earlier presented phenomenon. Contrast with the new is also at work here; the recognized quality is thrown into the stronger relief the more unrecognized its present surroundings are. Recollection makes description and classification possible, yet the idea of difference is actually at work in both operations. In all description and classification a certain type stands fast, at least provisionally, and the new phenomena are referred back to it, either as fully like (covering each other), or as qualitatively similar, or as analogous (similar in their relations). The positive concepts which we form embody such types. Where, for some reason, we can summon no recollection of similar phenomena and, consequently can set up no type, we collect the phenomena for the time being under a negative concept; that is, we give them the general mark of being different
from the types previously defined. In the history of classification, negative concepts have the merit of having made possible the collection of the hitherto undefined into a group different from the defined group, leaving it to later investigation to find within it positive definitions.  

In the history of philosophy, Plato's doctrine of ideas stands as the characteristic expression of the importance of descriptive and concept-forming investigation. Even the possibility of recollection in the midst of the confused multiplicity of phenomena filled Plato with emotion. To him, the highest power of the mind was that by which the different types underlying recollection were arranged according to their mutual likenesses and differences, so that a Thought-world reared itself in which one could mount up and down upon a continuously serial ladder.

When concepts have been formed in different connections, they can be united into judgments, and when different judgments
have common concepts which can be substituted for one another, conclusions can be drawn. By way of *inference*, concepts and judgments can be formed without having to go back to the experiences to which the descriptive and classifying sciences are bound at every point. There prevails here a continuity of a higher kind, since thoughts and thought-series of extremely different origin can be brought into combination. While recollection rests only on identity, judgment rests on rationality; here the relation between ground and consequence rules, and makes possible a new kind of understanding. I understand that \( A = C \), if I know that \( A = B \) and \( B = C \). This kind of understanding is acquired by means of the formal sciences. It is peculiar to these sciences that it makes no difference whence the first judgments and conclusions sprang, if only they have such a constitution that series of conclusions can be built on them. So the descriptive sciences do not concern themselves about the origin
of phenomena, so long as these allow themselves to be arranged according to relations of likeness and difference.

A third kind of understanding is to be found, where one neither advances merely from phenomena to concepts, nor merely builds new conceptual combinations by conclusions from given conceptual combinations; but where, on the contrary, one deduces new phenomena from previously given phenomena. The new phenomena are understood, when we think their relation to earlier phenomena to be analogous to that between the ground and the consequence of an inference. This kind of understanding characterizes natural science as it has developed especially since the Renaissance. In it the concept of causality is supreme. We combine experiences by it according to their inevitable and law-determined succession.

It is this third kind of understanding that has especially concerned the modern theory of knowledge, since Hume and Kant
pointed out the distinction between a logical inference and a real causal explanation. The possibility of creating and making use of the concept of causality has in modern times aroused an astonishment like that aroused in Plato's time by the creation of general concepts. It is, however, not only the intellectual necessity of finding a connection between experiences that has led to giving such prominence to the concept of causality, but also the necessity of distinguishing sharply between subjective ideas and objective reality. And this rests on the fact that the criterion of reality in doubtful cases is always, in the last analysis, the firm, inseparable connection of phenomena. The world of dreams and of thought is greater than that of reality ("narrow is the world and the mind is wide"), and man is under the constant and pressing necessity of so determining and combining his thoughts that they may stand as manifestations of a reality, since only thus can he expect to find the means of realizing his purposes.
The causal concept appears under two aspects: under a provisional, elementary form, with which we are often compelled to be content; and under an ideal aspect which all research and all theories strive after. *The elementary causal concept* presents only an unconditional succession: if the phenomenon A appears, then B inevitably follows, and B only appears when A has preceded it. It is not asserted that the causal relation holds between A and B themselves. It is possible that they are both the successively emerging consequences of a previous cause. *The ideal causal concept* goes a step farther and sees in the phenomenon, which we call the consequence, the *continuation* of that phenomenon which we call the cause, or its equivalent in a new form. The ideal causal concept consequently passes over into the concept of *development* or *evolution*; it is, therefore, no wonder that the latter has played a rôle in recent science only second to the concept of causality.
All three kinds of understanding rest upon certain axioms or principles. Unconscious thought—as it is exercised by the practical intelligence in the special sciences, in philosophical speculation, and in religious theory—does not feel impelled to undertake the investigation of these axioms, but the theory of knowledge overhauls them for a critical examination. The theory of knowledge arises when we ask, in what does the validity or truth of our understanding consist, and how far does it extend? Here again arises the problem of the relation between continuity and discontinuity. The problem arose, for Plato, through the irrational relation between idea and phenomenon; for moderns, through the irrational relation between formal science and real or natural science, science of fact. Can the concept ever be an adequate expression for the manifoldness of phenomena; or the law for their changing combinations?
For Plato, the solution lay in the theory that the ideas must have come down to man from a higher existence, and here, under the influence of the incomplete imitation presented by the perceptual world, must reveal themselves to thought in their completeness. In modern times, the idea of the conformity of nature to law has often been considered as an *a priori* truth, as an original intuition, which at most only had to thank experience for being the occasion of calling it forth. The incommensurability between the principles (the logical principles and the principle of causality) on the one hand, and experience on the other, has begotten this speculative theory of knowledge. This incommensurability has given birth to what one might call the *arbitrary* theory, because it so strongly emphasizes the arbitrariness of our original formulation of the principles, and not less strongly emphasizes the fact that in their pure form they can obtain no confirmation through experience,—that they can never become results, but only
remain mere postulates. Hobbes, the most pronounced champion of this view, says there can be no science of the principles of all science; that these principles are made by constructive art (principia sunt artis sive constructionis, non autem scientiae et demonstrationis), and we ourselves create their truth (rationis prima principia vera esse factus nosmet ipsi). According to Fichte the primary and unconditioned basis of all human cognition is obtained by means of a free construction; our science is based not upon a fact but upon an act; that is, upon the determination of the thinking consciousness always to keep in agreement with itself: upon the holding to the principle of identity. S. Kierkegaard makes a similar abrupt start in his establishment of the principles; and Kroman derives the principle of identity from the law of self-preservation, which seeks to hold the unity of consciousness intact; "by no means has it (the principle of identity) proceeded from experience."
Hence the speculative and the arbitrary theories both alike acknowledge that there must be definite empirical occasions to call forth the intuitions or the postulates. Empiricism (which passes over into Evolutionism if it takes account of the experiences not only of the individual, but also of the species), when it appears in its absolute form, lays chief emphasis upon these ‘occasions’ and treats them as complete causes. It has been set forth most lucidly by J. S. Mill and Herbert Spencer. It seeks to show how, under the long-continued influence of environment, general principles could gradually arise in consciousness; and it energetically asserts that no principle can possess validity beyond the empirical verifications which it may have won. Therefore, the principles have value only as results.

What empiricism cannot explain is the fact that the principles themselves beget experiences for us through the questions to which they incite. More auspicious here is a fourth theory, which has recently been developed
by Ernst Mach and Richard Avenarius, and which may be termed the *economical* theory. It concedes the rights both of passive experience and of the active development of thought, since it considers the principles as 'conceptual reactions' intended to win a view and comprehension of things by the shortest possible route. The reason why the principle of continuity plays such a leading rôle is said to lie in the fact that it is so economical a principle. The doubt is only as to the extent of its application. A man creates whatever concepts and principles he may need in order to make himself master of phenomena. Every practical and intellectual necessity is satisfied, if our thoughts are able completely to remind us of the facts of sense. This reminding is the goal and purpose of physics; and atoms, forces, and laws are only the means to facilitate it. They are of value only in so far as they help us.  

Maxwell and Hertz express themselves in similar fashion.

The four theories, which conceive the
principles of knowledge respectively as intuitions, as postulates, as generalizations, and as economic tools of thought, collectively presuppose the **analytic or regressive theory of knowledge** especially developed by Kant. For, what the object of the intuition or of the postulate or of the generalization may be, and what corresponds to the economic demand of the investigation; can only be discovered by the fact that one makes deductions backward from the data presented by experience, and finds the presuppositions on which an understanding of them is based. Such an analysis must form the basis of every theory of knowledge. But one will never be able to feel entirely sure that the analysis is complete. The history of science shows that this is a task which must constantly be undertaken afresh. At one time more, at another time fewer, principles than theretofore are thought to be necessary. A guaranty that absolutely the last presupposition has been reached can never be won. What the eco-
nomic theory (on which I will particularly dwell) especially emphasizes is, first, that no more principles need to be posited than the given case in strict necessity demands (this is the thought of Avenarius's *Kritik der reinen Erzählung*); secondly, that different principles may be necessary at different times or in different scientific situations, so that a principle that has for a long time furthered investigation, may later come to be recognized as inadmissible, without its historical significance being thereby ignored. The economic theory also emphasizes the law of parsimony and the character of the principles as determined by purpose and utility. It owes its being to two classes of motives: first, to the desire to reduce to a minimum the principles that cannot be proved; that is, from an anti-dogmatic or anti-metaphysical motive; and secondly, it arises from experiences in the history of science which show how principles and hypotheses may for a certain period be valid and fruitful, but later must be displaced by
others. The discussions carried on of late as to the validity of the mechanical conception of nature have directed attention to this second class of motives.

There are meanwhile two sides of the case which the special form assumed by the analytic theory of knowledge, in its appearance as the economic theory, inadequately emphasizes; and these become of special significance when the theory of knowledge is not considered as isolated, but is connected with other philosophical problems.

In the first place, those forms through which our intellectual demands are satisfied must be in keeping with the general nature of consciousness. What we understand, and that we understand anything, depends not only on the constitution of phenomena, but also on our intellectual organization, just as the colors which we see depend as much on the constitution of our visual organs as on the external objects. There is a certain type for all principles and hypotheses, which finally refers back to
the innermost nature of consciousness, and here, once more, one comes back to the necessity of unity and continuity. What and how many fundamental concepts (categories) and presuppositions should be postulated, — this is the problem that must ever anew be attacked in the battle of knowledge, if the standard is to be carried forward. Kant was suffering from an illusion if he supposed that one could once for all specify what would be necessary in this or that relation; but the old Master was not mistaken in declaring that the demand for unity and continuity lies at the bottom of all the forms through which we win or expect to win understanding. He himself has shown that all his categories can be traced back to the concept of continuity; and amid all the changes in the realm of principles this concept will undoubtedly be brought into play again and again. Logical principles, the principle of causality, and the fundamental doctrines of natural science, all hinge on this concept, which stands in
such close connection with the nature of consciousness. A purely psychological epistemology will never be able to afford satisfaction; because the fact that the demand for union and continuity — however essential it may be for consciousness — is satisfied by certain principles by no means implies that these are objectively valid. That demand may attain peace and satisfaction in many ways and under many forms, — as the history of mythology and of speculation sufficiently demonstrates, — ways and forms which as a rule entirely fail to satisfy the demands of economy, either with respect to parsimony or with respect to practicality. Schiller's words aptly express it: "Wide is the mind and narrow is the world." In the whole kingdom of thoughts of which the human mind disposes, there is only a strait and compact series that are of any use when it comes to valid understanding. The only necessary requirement is, that the assumptions which the understanding of the datum calls for shall be psychologically pos-
sible; that they shall be in harmony with the general laws of conscious life, and only special and detailed developments of what lies in those laws. Out of the thoughts involuntarily surging forth there must be a selection made, but this does not release us from conformity to general psychological laws.

Thus it comes to pass that a new disposition of a special kind is formed,—that an intellectual habit arises, which puts questions and criticises answers in a stricter, more definite way than is required by the involuntary course of thought. Every comprehensive principle—psychologically considered—is essentially the expression of such a habit, which may be more or less deeply imbedded in the nature of consciousness, i.e. which sometimes has the nature of an instinct, but sometimes seems more like the influence of custom. The purely logical principles approach most closely to the instinctive. The necessity of agreement with one's self, of the sequence of the train of
ideas, is not to be explained by parsimony
and fitness alone. When strict induction
from previous experiences leads to contra-
dictory results, we prefer to assume that the
experiences are incomplete rather than that
Being contradicts itself.

What is in the highest degree true of the
pure logical principles, is also true of the
more special ones. Thus the principle of
causality is an expression of our inclination,
on the occurrence of one event, to look
round for other events, in which the condi-
tions for the occurrence of the first may
be found. Here also appears our craving
to win for the content of consciousness
union and connection. The more special
and definite the satisfaction of this craving
is, the more powerfully the principle of
economy operates ,in its two forms: as
parsimony, which follows the short road
to the goal; and as effectiveness, which
takes the road that really leads to under-
standing. As examples, we have Kepler’s
and Newton’s demand for a *vera causa,*
we have the law of inertia and the law of energy, etc. What appears as an hypothesis from the purely empirical view, becomes, epistemologically considered, a principle, a regulative thought, under whose leadership consciousness may satisfy in the empirical world its demand for continuity and union.

In the second place, principles and fundamental hypotheses need not be conceived as altogether fortuitous or arbitrary; even though they should be ultimately but working hypotheses in the service of our intellectual economy, rather than literal parts of the Being that we wish by their aid to understand. The idea of a working hypothesis points in two directions: on the one hand, as already demonstrated, back to the nature of the thinking consciousness, since our consciousness can perform no function, however economical, which is entirely foreign to its own nature; on the other, to the reality to which the phenomena to be understood belong. A tool must be adapted both to
the hand that is to use it and to the object to be worked on. The thing, therefore, must in itself present aspects which correspond to the formal tendencies of our knowledge, however much these latter may also be conditioned by the circumstances under which, or perhaps by means of which, the knowledge works. This is the case with all valid knowledge, from its most elementary to its highest forms. So it holds with sensations, in spite of their 'subjectivity,' and it holds with the highest principles of abstract unified thought. Kant remarked, on the inclination to presuppose a unity behind the diversities of natural phenomena:32 "One may perhaps believe that this is merely an economical tool of Reason in order to save one's self as much trouble as possible, — an hypothetical attempt which, if successful, would borrow an air of probability from just this unity. But such a selfish view can very readily be distinguished from the fact that every one believes in, that this unity of Reason is congruent with Nature
herself, and that Reason here does not beg but commands, although unable to determine the limits of the unity which she assumes." So I would here add: wherever reason "commands" (or asks, expects, anticipates, postulates), she is, like all commanders, under the necessity of shaping her commands according to the capacity of the obeyer that she may have to deal with.

This last consideration leads to the question of the connection between the problem of knowledge on the one hand, and the problem of Being on the other. It is especially necessary to bring this into prominence because the analytic theory of knowledge — like the economic and, in its way, the arbitrary also — tends to set up a new concept of truth in place of our ordinary, naïve concept. The significance of principles is, that they may lead us to reach a rational understanding in our work. Their truth consists in their valid application; and this consists in their working value. That a principle is true, signifies that one can work
with it, and this means, if the remark refer to the principles of knowledge, that one can with their help advance to understanding, — firmly ordering and unifying the phenomena. The concept of truth is a dynamic concept, since it expresses in a definite fashion the application of mental energy; and it is a symbolical concept, since it indicates, not outward likeness or qualitative similarity to an absolute object, but relative similarity (analogy) between the things in being and in human thought. The old naïve concept of truth, according to which a cognition was true if it absolutely reproduced or mirrored 'reality,' is untenable, and it became so from the very moment when the subjectivity of sense-qualities began to be asserted. The subjectivity of sense-qualities, however, does not mean that they are invalid and unfit to guide us in the world. They stand constantly as tokens, signals, symbols, whose serial order we can point to as the expression of an objective series of events, although we cannot
demonstrate that they are copies of the objective series. The same relation obtains with logical principles and other fundamental presuppositions of our knowledge. The critical philosophy led to the result — a simple consequence of its analytic methods — that the truth of fundamental principles can only mean that they make intelligible experience possible; that they have, in fact, been found by analysis to be the necessary presuppositions of such experience. A comparison of our thoughts with an absolute world of things is impossible; we can only compare thoughts and experiences. Kant himself did not see this consequence as clearly as some of his disciples (Maimon and Fries); the master himself was still hemmed in by dogmatism, as can be seen in his doctrine of the ‘thing-in-itself’ as an absolute entity outside of every subject. But when he designates the law of causality as an ‘analogy of experience,’ and thereby understands that temporal events stand related in a way
analogous to ground and consequence in our thought, then he is on the point of making it into a working hypothesis. In modern times, as we shall soon see, there is more inclination on the side of natural science to recognize the "dynamic" and symbolic concept of truth than was the case so long as the mechanical conception of nature bore a certain dogmatic character. This new conception of truth, which works itself out in the realm of science, exhibits resemblances to the religious consciousness — as we shall see under the fourth main problem — in that it always sets itself in opposition to dogmas. In the religious realm, also, men are tending more and more to ask for its practicality and working value. The static notion of truth must everywhere give way to the dynamic.

Even after fruitful principles or working hypotheses have been attained, will Being be completely rendered by them? or will there always remain an irrational relation between the principles which may compose
our consciousness and the Being itself from which our experiences are derived? We shall find that under three different forms there is always an irrational remainder, viz. in the relation of quality to quantity, in the significance which the time-relation has for the causal concept, and in the relation between subject and object. Let us now consider each of these three points by itself.

3

In the attempt to reduce all given differences to identity and continuity, the especially characteristic thing was the effort to trace back differences of kind to differences of degree. In the science of material nature, this manifests itself as the attempt to explain all changes as motion in space. Motion from one place to another is the simplest change: it would therefore indicate a great advance toward clearness, if it could be shown that this is a kind of change which under different forms goes on in Nature wherever immediate experience
shows us qualitative changes. Long ago Aristotle taught that spatial motion lay at the bottom of all other changes, of all becoming and disappearing. He, however, held it impossible — as the atomists would have it — to derive all events in material nature from motions. Only after the uprising of modern science does this idea make its appearance in earnest. Galileo stands as the great founder of what we are accustomed to call (in the narrow sense) the mechanical view of nature. Besides the simplicity hereby attained — and Galileo was firmly convinced that nature strikes out the simplest path — the conclusion was also reached that we could operate with determinate quantities. Hence Galileo said: measure everything that is measurable and make measurable what is not! By this reduction, on the one hand, unity becomes possible, for qualitative differences can only be appreciated, not measured; and on the other hand, exact verification becomes possible.\textsuperscript{35}

The principles which serve as the basis of
the mechanical conception of nature were regarded by its weightiest champions as absolute truths, as fundamental laws of Being. In so far as they nevertheless believed that these principles needed a basis, they drew them directly, out of the being and will of God. Herein were Cartesians and Newtonians at one; and the materialists parted with them only because they held the theological basis to be superfluous and impossible. By a series of magnificent discoveries and explanations this general view of nature has demonstrated its fertility. For us, the question is, Can it be considered a finality from the epistemological point of view?

Now, even if we should assume that everything in material Nature can be explained by the principles of the mechanical philosophy (and this, as we shall soon see, has recently been doubted in scientific circles), it is in the first place clear that qualities are not driven out of the world because they are ‘reduced’ to quantities, or because they
are attributed to the sensationally perceiving subject. They remain as immediate facts to be empirically recognized. The properties of a chemical product cannot be derived from the properties of its elements; and if one kind of psychical energy conserves its equivalent in another kind of psychical energy, yet the equivalent has new properties which cannot be derived from the properties of the first form of energy. But one cannot make the sensationally perceiving subject create these qualities out of nothing; in any case, we should then raise insoluble psychological difficulties, as bad as any of the physical and chemical difficulties which we were trying to get rid of.

In the second place, extension and motion are, in the last analysis, themselves qualities; actual properties which in themselves might call for an explanation just as much as the so-called special sense-qualities. Since Berkeley's and Leibniz's time this has often been asserted on the philosophic side. There are no grounds to suppose that their
quantitative properties express the innermost essence of things. The reason why science seeks these out so fondly and lingers by them is really only because with their help one can give exact descriptions of material phenomena, and from them can draw definite conclusions. This doctrine has recently been strongly championed by investigators like Maxwell and Hertz, by the latter as an explicit addition to the above-mentioned economic theory of knowledge. "The advance of the exact sciences," says Maxwell, "rests on the discovery and development of appropriate and exact ideas, by means of which we can form a mental representation of the facts which shall be sufficiently comprehensive to stand for every individual case, but at the same time sufficiently exact to warrant the conclusions which by means of mathematical calculations we draw from them." And according to Hertz ('Principles of Mechanics,' Introduction), in order to be able to derive the future from the past, we create images or
symbols of such a kind that the effects deducible from the images by thought shall also be images of the effects that follow in the course of Nature from the imaged objects. The dynamic and symbolic notion of truth is here expressly put in the place of the naïf dogmatic concept to which the mechanical conception of nature formerly swore fealty. The problem reduces itself to finding a group of symbols which can be employed with entire consistency, and from which conclusions can be drawn that will be confirmed by new experiences which can themselves be again expressed by the same group of symbols. But by this method we never get rid of the possibility that another set of symbols might have expressed the actual experiences as well or better, and furnished equally verifiable deductions. It can never be proved of any set of symbols that it is the only right and necessary and possible set.

The epistemological reflections to which recent investigators have thus been led have
arisen from the difficulty either of subsuming electrical phenomena under the mechanical conception of nature, or of deriving the principles of the latter from the laws of electrical phenomena. The latter possibility has been defended recently by Hertz, the earlier one by Boltzmann. Of the greatest interest, therefore, to epistemology is Maxwell’s criticism of the ordinary notion of matter, according to which matter is considered to be an extended mass. According to Maxwell, the weakness of this concept is that it tends to think of matter as inert. But it is motion which makes rest intelligible, not the reverse. The doctrine of motion must therefore precede the doctrine of equilibrium; dynamics must precede statics. From motion we attain the notion of force or energy, by means of which equilibrium becomes intelligible. But if we understand by matter the constant, the unchanged amid all changes, this can only be the law-element in motion, and thus the essence of ‘matter’ will consist in motion.
Further, it is, according to Maxwell, a prejudice to regard matter as extended and molecules as hard — for then we must ask what holds the parts of the molecules together, and come to molecules of the second degree. But we must constantly operate with geometrical as well as with dynamic concepts, whether we consider the last elements as really extended or not. It is only as a passive property that extension is attacked by Maxwell; thus if I draw a line on the table, the motion is the essential thing in the line.\textsuperscript{32} Here there comes to the surface an epistemological point of view of extreme importance: static conditions always contain problems which can only be solved by substituting motion for rest. Potential energy is understood only through actual energy, capacities and tendencies only through their results. This law holds everywhere, in the psychical as well as in the physical sphere. There is a half-mystical, half-materialistic inclination to find perfection in contemplating — or gazing at — some-
thing unchanging.\textsuperscript{39} Maxwell has made an important contribution toward eradicating this inclination. But the great question is, whether the idea of the continuity of motion or activity can be carried into all spheres. Even if the dynamic asserts its epistemological priority over the static, the static cannot be got rid of as a fact; it always springs up again before us with its problems for thought, and Maxwell himself recognized this in maintaining that geometrical as well as dynamic concepts are indispensable to the explanation of nature. In contrast to the dynamic, the geometric denotes simultaneity. In the realm of material nature, simultaneity appears in the form of space\textsuperscript{40}; in the psychical realm, the relation of simultaneity does not take on this geometric form, but appears as a 'static' element, which sets new tasks for the inquirer after he has by dint of hard work found the laws of psychical change. After the continuity of developmental processes has been demonstrated, it must be proved that there is
continuity between the processes and the static conditions. Here again we run upon the standing problem; this would present itself, even if qualities had found complete explanation by means of their representation by quantities; or even if the physical axioms, with which science works, were not merely the most complete and appropriate set of symbols which have yet been formulated and employed, but were something more. The possibility of an irrational relation between Being and our knowledge can therefore not be ruled out of court.

4

The investigation of the relation between the elementary, or empirical, and the ideal concept of causality will lead to a similar result. In its elementary form, the notion of causation means, as we saw, only such a relation between two effects that, after one has appeared, the other also inevitably appears. But from this idea of inevitable sequence, investigation proceeds by observa-
tion, tests, and hypotheses to demonstrate as far as possible such a continuity in the series of effects that the differences between the members of the series are diminished, until finally even the difference in time is reduced to a minimum. From an external, although inevitable sequence, thought thus works down through continuity to complete identity of cause and effect. Although the time-relation plays an essential rôle in the elementary law of causation, it is almost entirely eliminated in the ideal concept of causality. If this process could be applied throughout, we should reach the paradoxical result that the complete explanation of causality involves the very abolition of the causal concept: for the causal relation is only differentiated from the purely logical relation of identity between cause and effect by the temporal difference between the terms.

The philosophy of the seventeenth century (Spinoza and Leibniz) made no distinction between cause (causa) and reason (ratio); the causal relation between two phenomena
was to them the same as the relation between the premises and conclusion of a syllogism, only a relation of identity. It appeared to them self-evident that in the effect no more could be contained than in the cause; that the time-relation between the members was a matter of indifference, and that time was anyhow only at home in the dim sphere of ideas and imagination. In Hume's handling of the problem of causality, this is also involved, since he declared that there was nothing to warrant the inference from past to future. According to Hume, the experiences of the past could only show that a thing once, at a single moment, possessed a certain potentiality, but not that it always possesses or will possess it. Kant, to be sure, believed a rational proof could be given for the validity of the doctrine of causality; but he said that the causal relation and the relation between reason and consequence were only analogous, not identical, the causal relation signifying to him that events follow one
another analogously to the way in which the conclusion springs from the premises. The causal relation would thus contain a rule by which we could attain unity in our experiences.  

In recent times, the attempt has been made from two different bases to eliminate the time-relation; and consequently, to cast overboard not only the elementary causal concept, but ultimately the whole causal concept.

From the 'speculative' quarter it has been asserted that the time-relation always indicates an imperfection, an incomplete stage of development. So long as the time-relation determines our conception of being, our conception is on that very account incomplete, and the reality, of the time-relation is irreconcilable with the idea of complete knowledge, of absolute truth. Our knowledge always works away from the time-relation; the more clearly we understand anything, the less significance does the time distinction have,—the more does knowl-
edge of mere fact pass over into formal knowledge, that of causes into that of reasons. What at first we called cause and effect will with the advance of knowledge appear as members of a totality, as members which stand in a fixed relation to one another, in a rational relation to which temporal sequence is unessential. The fact that we became aware first of the one and then of the other member, has no significance; in our recognition of the law the whole past appears to us as a unity. Not the time-relation, but the unity behind the time-relation binds what we call the cause to what we call the effect. Moreover there exists no time interval between the end of the event, which we call cause, and the beginning of the event, which we call effect. The English philosophers Francis Bradley and Bernard Bosanquet have given currency to this view, which is intimately connected with a speculative interest in the idea of totality, and in absolute conclusions.

From an entirely different basis—which
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may be designated that of ‘pure experience,’ and of which Richard Avenarius and Ernst Mach are the chief exponents — reasoning has worked in a similar direction, but from other motives. The attempt here is to cut away from the immediate datum all those associated ideas and auxiliary notions with which we involuntarily or methodically supplement our experience. The advance of knowledge consists in a reduction of differences (to a ‘heterotic minimum’) and in an approximation to a pure description of a continuous process. During this advance, the content of knowledge becomes constantly more confined to descriptive statements, as far as possible with analytical transitions, and the distinctions are reduced from qualitative to quantitative, as far as possible with the constant proof of equivalence. It is no longer the function of strict science to explain; whoever wishes ‘explanations’ is referred to mythology and metaphysics; it is the aim of science to give an exact, methodical description of all
relations and transitions. What specially concerns the causal relation, so this view asserts, is, first, that every employment of the concept of cause and effect cuts out two elements arbitrarily from the context in which they stand, and places them in antithesis; secondly, that the time-relation can readily be reversed as soon as one has demonstrated an equivalence or as soon as one ignores the direction in which the change takes place."

The epistemological views which, by these methods, would from various motives seek to eliminate the elementary causal concept and combat the chief significance of the time-relation, can be characterized by saying that they set up an ideal knowledge instead of the real knowledge which we can at any given time attain. Every definite investigation must begin at a definite point, which lies where the problem itself crops out. The problem crops out when two of the members in a series of events draw attention to themselves, and arouse supposi-
tions as to their inner connection, or when a single member appears alone or suddenly, and thereby gives rise to the necessity of finding intermediates by which it can be brought into connection with all the rest of the series. The point of departure seized upon is in so far fortuitous and arbitrary; but in the nature of the case it can be nothing else. Our knowledge develops historically, because the attention of men is only aroused under certain definite conditions. If attention were at all times directed indiscriminately with equal strength to all the members of the series of events, no knowledge at all would be possible. Naturally, it is of importance that one should be conscious of the fortuitous or subjective nature of the point of departure and of the bit of experience cut out, but with the advance of the process of knowledge, one gets beyond this, because the fragmentary experience is worked, by understanding, into a great continuous whole.
This historical character of our knowledge is also evident when we recall how we always stand between the experiences of the past and the possibilities of the future. *At every instant* we must distinguish between the present and the expected datum; that is the cause, this the effect, and the expectation can never be more than an hypothesis. The single instant, in which on the one side stands a 'no more,' on the other side a 'not yet,' presents the problem in its whole intensity, an intensity which only the numbing power of custom can lessen. The puzzle will not be wanting with new problems—and so long as knowledge strides forward, it will seek and find new problems. The full connection between events always appears afterward, and until it appears, the assumption of it stands as an hypothesis. Concepts like force, energy, cause, or possibility (which with different shades of meaning express one and the same relation; namely, the dependence of later conditions on the preceding) will therefore never cease
to be needed; this dependence is differentiated from the relation of purely logical and mathematical dependence by the fact that it is at once a temporal and a rational relation, because the resulting condition comes after as well as out of the preceding condition. Even if continuity should have been demonstrated by means of never so many intermediates and degrees of transition, this time-relation would nevertheless remain valid for every little step between two of the graded members.

No change would follow here even if equivalence had been proved between the separated states. Hume’s problem has by no means been solved, as has sometimes been said, by the discovery of the conservation of energy. An equivalential relation does not exclude a qualitative difference, but directly presupposes it: for example, I have no reason to set up the equation $A = B$, unless $A$ and $B$ appeared different before I found by closer examination that they could be substituted for one another.
If such an equivalence has been found, it will make no difference whether we pass from A to B or from B to A; but when we found it, we began with A or B and proceeded by way of investigation to the other term.

In a judgment, we must, therefore, discriminate between the psychological process through which the judgment arises—and in which there is a definite difference between the initial idea (the subject) and the concluding idea (the predicate)—and the finished judgment that can be formulated as a relation of identity, in which the difference between subject and predicate loses all significance. But in external events, the order of members has the same significance that it has in the movement of thought. If I have recognized that there is an equivalence between heat and motion, it is, considered purely abstractly, a matter of indifference whether I go from heat to motion or from motion to heat. But, in the real world, the 'direction of change' is
a question of life and death. Being, in fact, grows different according as the preponderant changes tend in this direction or in that. Time, therefore, cannot be reversed, and this proves that equivalence cannot be the end-all of our knowledge. Besides their equivalence, we must know the actual direction of the transformations of fact; and this knowledge can only be won from constantly new experience.

And here we come upon the fact that every relation of equivalence,—as, in general, every causal relation—first becomes effective in fact when certain conditions, especially forces of release, are present. With respect to the presence of these conditions, there arises a new problem: Can one also show that these forces of detent stand to their own causes in a relation of equivalence? We light here upon an endless series, in which definite, concrete answers give out long before the questions do. We have here also, a purely logical analogy; since every absolute relation of
identity \((A = B)\) of two concepts rests, on nearer inspection, upon definite conditions (so that according to Jevons's formula it might be expressed \(AC = BC^4\)), there arises the new question, how the identity is related to this condition \((C)\); and so thought wanders on indefinitely.

There is, then, no prospect of freeing ourselves from the historical elements of our knowledge. The measure of the development of our knowledge consists, first, in the extent to which the elementary notion of causation (inevitable succession) can be employed rather than the bare fact of occurrence of simultaneous or successive differences; and thereafter, in the extent to which this elementary notion can be replaced by the ideal concept of causality (equivalence or identity). But the process of knowledge consists at all times in an ascent through the three stages here pointed out,—an ascending process that must always be repeated from each new starting-point. This necessity is conditioned
by the reality of the time-relation. Hence, absolutistic conceptions — whether they appear in idealistic or realistic form — always have a tendency to slight the time-relation or to consider it as only 'empirical,' if not illusory. If the time-relation is an illusion, it is another illusion of the second potency if we imagine that we can lightly rid ourselves of it. For us, existence can never be absorbed into thought without remainder.

5

From yet a third point of view, the problem of knowledge reveals itself in all its severity, while at the same time a continual development of knowledge appears to be possible. In every cognition we can distinguish between a subjective and an objective element, between the knower and the thing known; both terms, however, are only given in mutual relation, although within the relation either may be the more prominent term.

What part, then, of our knowledge is subjective and what objective? Already, from
our discussion, it is evident that this question may be variously answered. In the domain of natural science, there is a tendency to credit all qualitative differences, everything that breaks continuity, and ultimately, perhaps, everything that violates identity, to the Subject. Sense-qualities, space and time distinctions, are also only subjective. Arguments for this view may be found in the fact that the differences which we perceive in qualitative, extensive, intensive, and protensive (temporal) relations are due to our psychic dispositions. Our sensations are acts of discrimination whose results depend upon the organization and previous history of the feeling Subject. The differences discovered have value only in relation to the point of view of the Subject in his different relations. To this must be added the discontinuity of our attention, which moves by jerks, now toward, now away from, its object; and from this also arise differences and interruptions which cannot be attributed to the object.
The dogmatic and speculative school of philosophy and of natural science has been inclined to follow this line of thought. The emancipation from the merely subjective here would lead immediately towards continuity and identity as the essence and norm of truth.

The critical philosophy asserts in rebuttal that the qualitative, extensive, intensive, and protensive differences form the material given to our knowledge and set the tasks of our investigation. As our personality endeavors to weld together its sporadic elements, to harmonize conflicting tendencies, and to free itself from obscurity and self-contradiction, so our understanding endeavors to transmute the differences actually given to us into stages of one and the same continuous developmental process, or into forms of one and the same content. The demand for continuity and identity lies in the depths of human consciousness; and man seeks, therefore, to find them again in the content given to
knowledge. Furthermore, consciousness itself cannot give rise to the differences which form the material for it to work on, no matter how much the shape and degree with which they appear in consciousness may have been determined by its involuntarily operating conditions. In the most recent discussions of the epistemological basis of natural science, there is a tendency to derive all unifying simplifications mainly from the economy of the knowing Subject.

In reality, we nowhere and at no time possess the pure Subject, with its forms, as an antithesis to a pure object, or rather 'thing-in-itself,' from which the plurality of the content of knowledge comes. Kant decided this point prematurely in thinking that the subjective forms of knowledge could be determined once for all so that the 'matter' of knowledge would be left to come from the 'thing-in-itself.' But in the special development of his epistemology he could not avoid asking whence the forms sprang, or pointing out that they
too are determined ultimately by the 'thing-in-itself,' since the forms no less than the 'matter' are given and must be ascertained through psychological analysis. And since the 'forms' designate the more constant element of our knowledge, the underlying presupposition of Kant's philosophy turns out to be something that he could not claim to verify, namely that the 'thing-in-itself' works uniformly — for forms otherwise could not exist, or at any rate could not be applied. Kant, consequently, hesitated between the two views above described, although it was evidently his intention to cling to the latter. Continuity was for him the general basal form of the categories, and synthesis the fundamental law of action of the knowing consciousness.

The problem is more complicated than Kant saw it. If we distinguish in our knowledge between Subject and Object, we really set up an objectively determined Subject ($S_o$) as the reverse of a subjectively determined Object ($O_s$). The properties or 'forms,'
which we attribute to the Subject, cannot be explained from the concept of the Subject itself (the pure S); they are there as objective facts, quite as much as the other properties with which our knowledge has to do. In like manner, the properties or determinations which we attribute to the Object always belong to it only in relation to a Subject, and indeed, upon closer consideration, to a Subject of a certain peculiar constitution. Hence the problem always repeats itself: Whence does the Subject get its objective content from? and what relation obtains between the subjective determinations (qualities, etc.) of the Object and its proper essence, as Subjects of a different nature from ourselves would apprehend it?

Here, again, we run up against the irrational, and here perhaps we see most clearly how inexhaustible Being is, in comparison with our knowledge. The justification of Kant’s setting up the notion of the ‘thing-in-itself’ lay in the fact that a transcendent concept is needed in order to express the
irrational relation between what he called the ‘form’ and the ‘matter’ of our knowledge. Yet if we wish to hold to the notion of the ‘thing-in-itself,’ we can use it in the spirit of Kant and still avoid the contradictions which cling to it in Kant’s philosophy. We can do this by employing it to express the fact that the difference between Subject and Object always springs up anew whenever we think we have found an objective explanation of the character of the Subject or a subjective explanation of the character of the Object. Each refers to the other indefinitely, and the irrational crops out in the fact that an infinite series (of the type: \( S_1 \{ O_1 \{ S_2 \{ O_2 \ldots \) is both possible and necessary. Thought must constantly be set to work afresh to find predicates for the determination of being, because the springs which feed the stream of thought are inexhaustible. The ‘thing-in-itself’ is the vague starting-point of thought, which ever and anon reappears in new form and calls for new determination. It may be
that the true symbol for the relation of our knowledge to Being should not be an irrational but an imaginary number, since being may possess attributes that cannot be comprehended or defined by means of the dimensions in which our thoughts can move. That this may be possible can in any case no more be contradicted than the possibility that being may be rational only in a very narrow sphere, and that it might some day turn toward us another side, about which we could build no structure of connected and practical thought. Then, as I have elsewhere shown, a logical ice-age would set in for us. The relation between Subject and Object would not arise at all; there could be neither an $S_0$ nor an $O_0$.

In an earlier connection I made use of Schiller's words: "Wide is the brain and narrow is the world;" and now the sentence can be reversed: "Wide is the world, and narrow is the brain!" Knowledge, however rich and powerful it may be, is after all only a part of Being; and the problem
of knowledge would be soluble, only if Being as a totality (in so far as we can conceive it as such a totality) could be expressed by means of a single one of its parts. In any event, our expression must always remain symbolic; even when our knowledge reaches its climax, it gives us only an extract from a more inclusive whole. Among all the possibilities of thought, only a single one appears in the reality recognized by us. The reality which we recognize is, however, only a part of a greater whole,—and here we are not in a position to determine the relation between the parts and the whole. An exhaustive concept of reality is not given us to create.