THE DEVELOPMENT OF EMPIRICISM IN MODERN PHILOSOPHY
THE DEVELOPMENT OF EMPIRICISM IN MODERN PHILOSOPHY

by

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Recent trends in philosophy, such as the investigation of the nature of language and the inclination to a formalist theory of mathematics, have enabled us to return with new insight to an examination of the development of empiricism. The collapse of older scientific theories under the strain of new discoveries has necessitated a close scrutiny of the epistemological foundations of science. Under such conditions science has returned, not to the systems of the German metaphysicians of the last century, whose enterprises are now generally held to be failures, but to the utilization of the epistemological discoveries of such empiricists as Berkeley and Hume.

An examination of the development of modern empiricism is therefore timely. The inclusion in this thesis of a survey of the work of Locke, Berkeley, Hume, Mill and Russell needs no justification. But since an attempt to give a comprehensive account of all present day movements is impossible here, some selection has been necessary at this point. In choosing such contemporary writers as Schlick and Reichenbach, I have been guided by the considerations that their work is fairly representative of modern thought, that its intrinsic merit is high, and that it is closely related
to the contributions of the earlier philosophers studied in this thesis.

I have preferred to trace the development of empiricism from as fresh a viewpoint as possible, and have consequently made only the scantiest use of secondary material. The thesis has been written at the suggestion and under the direction of Professor J.A. Irving of the Department of Philosophy and Psychology, to whose teaching any merits it may have must be attributed.

W.M. Sibley.
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CHAPTER I

JOHN LOCKE: "AN ESSAY CONCERNING HUMAN UNDERSTANDING"
Modern philosophy takes its rise from the epistemological problems raised by Galileo's bifurcation of the world into measurable and non-measurable aspects; into primary and secondary qualities; into objective and subjective characteristics. Half a century after the publication of Galileo's "Discourse on Method", and half a century after Descartes had given clear expression to the movement in philosophy known as Rationalism, John Locke outlined in his "Essay concerning Human Understanding" the empirical position: that the problem with which philosophy had to cope was to be solved not by appeal to "a priori" principles such as those of mathematics, which had so captivated the mind of Descartes, but by recourse to a psychological analysis of the structure of our knowledge of the external world as that knowledge is brought to us through sense perception.

The doubts cast on the validity of our knowledge of the external world arose from Galileo's division of that world into primary and secondary qualities, and from the difficulties which consequently came to replace the previous comfortable assurance of the medievals that the world was fundamentally such as it appeared to us. If it could not be maintained that we had direct and intuitive knowledge of the external world, then the validity of our knowledge of it could obviously only be preserved by the assumption which Descartes made, that our ideas are faithful representations and copies of some more substantial reality lying behind and supporting them. Descartes also separated in decisive manner the two
substances, "res cogitans" and "res extensa", thus contriving to render still more distant from the mind the now rapidly disappearing material world. His Theory of Representative Perception, and his division of mind and matter are in general the premises on which Locke starts. The question which takes prime importance for Locke is the problem of the sense in which we have knowledge of the external world, and of the validity of that knowledge.

Locke's general position of Empiricism becomes evident in his famous polemic against the existence of innate ideas. Descartes believed, with other philosophers before and after him, that certain principles according to which the mind operated could not be derived from sense experience. These principles could be regarded neither as subordinate and posterior to that experience, nor as voluntary creations of the mind. The idea of God, for instance, was one of these inherent notions: according to Descartes it could not be traced to any sense impression, and could not have been formed by our finite minds. Consequently it must be "innate": it forms an element in that which the mind itself brings to knowledge. Lesser thinkers seized upon this doctrine, and in giving greater substantiality and greater number to these innate ideas, arrived ultimately at impossible absurdities. Locke's attack on these cruder conceptions is vigorous and successful, although he gives no answer to the underlying problem of the nature of the "a priori". His cardinal assumption admits of no compromise with innate principles:
"the senses at first let in particular ideas, and furnish the yet empty cabinet". We commence life with a tabula rasa on which there are no "innate ideas". With Locke's examination of the doctrine of innate ideas we need not concern ourselves in any detail. His main purpose in attacking it is simply to gain acceptance for his basic premise as to the origin of our knowledge, particularly as it is concerned with the external world.

I. THE SOURCES OF OUR KNOWLEDGE.

The materials of reason and knowledge come from experience alone. Most of our ideas are derived from the operation of the external world on our senses. The second source of our ideas is the perception of the operation of the mind about these sense experiences. By "reflection" Locke states specifically that he means "that notice which the mind takes of its own operations", and from which we obtain a set of ideas such as of perception, thinking, reasoning, etc. The proof that our ideas come only from these two sources is obtained by hypothesizing the state of knowledge a man would have if denied access to any of the sources of sensation. In the reception of simple ideas the understanding is for the most part passive. The mind gives no law to Nature, but is "forced to receive the impressions and cannot avoid the perception of those ideas that are annexed to them."

1. Locke, "An Essay Concerning Human Understanding", Bk. I, Ch. II, Sect. 14. (All other references are to the "Essay".)
3. The problem of the nature of these "operations of the mind" is apparently held to be unanswerable, e.g. in Bk. II, Ch. IV, Sect. 6, he states that "Thinking", being a simple idea, can be known only by experience, and is, therefore, as we shall see later, undefinable.
Under the influence, possibly of Boyle in particular, and certainly of the atomic theory in general, Locke proceeds to a theory of the structure of our knowledge. The atom here is the "simple idea". Like the atom, it cannot be created or destroyed by any fiat of the imagination. A simple idea may come into the mind from one sense, or from more than one; from reflection only, or by all the ways of sensation and reflection together. All other ideas are complex and are necessarily built up from simple ideas. The simple idea cannot be broken up into smaller parts and (therefore) cannot be communicated. It can be known only by experience.

If Locke holds a copy theory of knowledge it certainly is not of the "photographic correspondence" type. "Whatsoever the mind perceives in itself or is the immediate object of perception, thought, or understanding, that I call 'idea'; and the power to produce any idea in our mind, I call 'quality' of the subject wherein that power is". As to the correspondence between the idea and its original, he says that "most of those of sensation (are) in the mind no more the likeness of something existing without us than the names that stand for them are the likeness of our ideas".

There follows the well-known division of the qualities in bodies into primary and secondary. Primary qualities are those which "are" utterly inseparable from the body, i.e., those without which we cannot think of the body at all. They

1. Bk. II, Ch. VIII, Sect. 8. Locke admits that he does not always adhere strictly to this terminology, as he sometimes speaks of ideas "as in the things themselves."

2. Bk. II, Ch. VIII, Sect. 9.
are five in number—solidity, extension, figure, motion or
rest, and number. Colours, sounds, tastes, etc., are
secondary: they are mere functions in us of the disposition
of the insensible parts of the bodies.

II. THE MANNER IN WHICH THE EXTERNAL WORLD AFFECTS OUR SENSES.

In accordance with previous theories Locke holds that
the primary qualities "produce" ideas in us by mechanical
impulse. "Singly imperceptible bodies" come from the external
object and are transmitted through our own nervous mechanism
to the brain, where in some fashion the appropriate simple
idea is produced. Ideas of secondary qualities arise in

1. I think it is important to consider the basis of bifurcation
here.

(1) The primary qualities listed by Locke include the
measurable and mechanical aspects of the world. Are the
separation and the insistence that the measurable aspects are
the ultimate ones due merely to a prejudice arising from the
success of the scientific technique which resulted from
Galileo's selection of those qualities as being the subject
of mathematical and physical inquiry?

(2) Most of our perceptual thinking is done in visual
and tactual terms. "Sight (is) the most comprehensive of
all our senses, conveying to our minds the ideas of light and
colours...and also the far different ideas of space, figure
and motion." (Locke, Bk. II, Ch. II, Sect. 9) It is conceivable
that a hypothetical man who had no visual, tactual or
pressure senses, but had an extremely well-developed olfactory
sense, would think of odor as being the primary quality of
the world, without which he could not imagine anything to
exist; whereas when we conceive of an object existing apart
from us we do so mainly in visual-tactual images. It has been
suggested that this division of the primary and secondary
qualities illustrates our prejudice in favor of visual-tactual
sense information, i.e., that it is a psychological prejudice.
The argument by which Berkeley negates the division is
certainly psychological.
similar manner. In their case, however, the differences in the sensations corresponding to different bodies must on this theory be attributed merely to differences in the disposition and constitution of the minute parts of the particular external body, since the secondary qualities have been denied the same status as the primary ones. The further conclusion drawn by Locke is that "the ideas of primary qualities of bodies are resemblances of them, and their patterns do really exist in the bodies themselves; but the ideas produced in us by these secondary qualities have no resemblance of them at all."

III. THE OPERATIONS OF OUR MENTAL FACULTIES.

Although the psychological structure which Locke set up had a great influence on later psychology, here we need only sketch it briefly. The first simple idea of reflection is perception. In bare perception, the mind is "for the most part, only passive, and what it perceives it cannot avoid perceiving." But the mind must take notice of these impressions before there is perception; and ideas of sensation are often changed by the judgment. "Perception is the first operation of all our intellectual faculties and the inlet of all knowledge into our minds." Retention of the ideas derived from sensation and reflection is achieved

1. Bk. II, Ch. VIII, Sect. 15.
2. Bk. II, Ch. IX, Sect. 1.
3. Bk. II, Ch. IX, Sect. 15.
in two ways--by contemplation and by memory. Attention, repetition, pleasure and pain help in fixing ideas in the memory.

Locke notes the importance of "the faculty in the mind" which can discern and distinguish between various ideas. On this faculty depend clarity of perception and the evidence and certainty of "general propositions, which have passed for innate truths." Secondly, the mind has a faculty by which it can compare ideas in respect of extent, time, place, etc., thus giving rise to relations. Thirdly, the mind can combine simple ideas from sensation and reflection into complex ones. The mind also has the power to assign names as outward marks of internal ideas. Finally, the mind can abstract from several experiences that which is common to all and at the same time independent of the particular circumstances, and thus creates universals.

By combining, comparing, and abstracting, the mind forms from simple ideas, complex ones, which are of three classes: modes, substances, and relations. Modes are complex ideas which are not considered to subsist by themselves but are regarded as dependences on or affections of substances. They are either simple or mixed. "These mixed modes, being also such combinations of simple ideas as are not looked upon to be modes, substances, and relations. Modes are complex ideas which are not considered to subsist by themselves but are regarded as dependences on or affections of substances. They are either simple or mixed. "These mixed modes, being also such combinations of simple ideas as are not looked upon to be

1 Bk. II, Ch. II, Sec. 1. Having denied the existence of innate ideas Locke affirms the existence of a "clear discerning faculty of the mind" which enables us to give universal assent to certain propositions—a not very helpful improvement on the original doctrine of innate ideas.
characteristical marks of any real beings that have a steady existence, but scattered and independent ideas put together by the mind, are thereby distinguished from the complex ideas of substances." The ideas of substances are such combinations of simple ideas as are taken to represent distinct particular things subsisting by themselves, in which the supposed or confused idea of substance...is always the first and chief."

Relation consists in the consideration and comparison of one idea with another.

Locke gives a detailed account of some of the simple modes and their manner of derivation. Space and time he considers to be empirical. Thus, the simple idea of space comes by our sight and touch. Considered barely in length between any two beings, space is called distance; if considered in length, breadth and thickness it is called capacity. The idea of place comes from consideration of "the relation of distance betwixt any thing and any two or more points, which are considered as keeping the same distance one with another."

Reflection on the train of ideas in our minds gives us the idea of succession. Duration is the distance between any parts of that succession. Time is duration set out by measures. Eternity is the addition of durations past or to come "ad infinitum."

1. Bk. II, Ch. XXI, Sect. 1.
2. Bk. II, Ch. XII, Sect. 6.
Unity is an idea brought in from every object of sense, every idea; in precisely what manner, Locke does not say. Repetition of this idea and addition of the repetitions give us the complex ideas of the modes of unity. Locke thus endeavours to place mathematics on an empirical basis, but makes a certain concession to formalist theories when he admits that names are necessary for the conception and manipulation of numbers.

The lengthy discussion of the mode "power" has importance from the point of view of psychology or ethics but not from an epistemological standpoint. Locke traces the source of the idea to the mind's perception "of the alteration of simple ideas it observes in things without" and to reflection on the constant change of its own ideas within; but he does not follow up his inquiry along Hume's line. Power has a twofold aspect--passive and active, the latter forming a great part of our complex ideas of natural substances. In accordance with his view, however, that the clearest idea of active power is to be found by reflection on the operations of the mind rather than from external sensation, Locke confines himself mainly to an examination of the nature of volition.

1. Bk. II, Ch. XXI, Sect. 2.
IV. THE EXAMINATION OF SUBSTANCE.

The problem of our knowledge of the external world comes to centre on the notion of "substance". The statement and nature of the problem present little difficulty. Locke has reduced our knowledge of the external world to ideas aroused in us by corresponding qualities and powers in the objects of sense perception. We observe that certain of these ideas regularly go together and are inseparable from one another. Not being able to imagine how qualities corresponding to our ideas can subsist by themselves, we consider that they belong to "one thing" and that they find their support in a substratum which we call "substance." Our notion of pure substance arises from the need we feel of conceiving a support for the qualities or "accidents" which arouse the simple ideas in us. Inquiry into the nature of substance reveals no clear notion of it further than that of being the support of certain qualities found regularly to co-exist in our experience.

A similar postulation of substance occurs when we turn to mental events. From reflection we are conscious of the ideas of thinking, reasoning, willing and other mental functions. We cannot conceive how these can subsist of themselves, and hence we postulate a thinking substance in which they somehow inhere. We have as clear an idea of mind as of body; Locke maintains, simply because we have a clear idea of neither. The primary ideas we have of body are the cohesion of solid, separable parts, and a power of
communicating motion by impulse. The primary ideas of spirit are thinking and willing. The ideas of existence, duration and mobility are common to them both.

In general, then, when we speak of "substance" we must limit ourselves to speaking of particular collections of ideas. Our complex ideas of substances are made up of three sorts:

(1) The ideas of the primary qualities, which are in the bodies independent of our perception of them.

(2) The ideas of the secondary qualities, which are ideas produced in us by the powers that substances have by virtue of the constitution of their primary qualities. As stated earlier, Locke's theory necessarily maintains that the "secondary qualities of bodies would disappear, if we could discover the primary qualities of their minute parts."

(3) The idea of "the aptness" in any substance to give or receive such alterations of primary qualities as will produce different ideas in us from those formerly produced. These active and passive powers of substances depend finally on sensible simple ideas, and make up a great part of our complex ideas of substances.

1. Bk. II, Ch. XXIII, Sect. 11.
We have, then, no abstract, clear idea of "substance." Beyond the ideas which come from sensation and reflection our faculties cannot penetrate. The simple idea is the ultimate: it seems probable to Locke "that the simple ideas we receive from sensation and reflection are the boundaries of our thoughts; beyond which the mind, whatever efforts it would make, is not able to advance one jot; nor can it make any discoveries, when it would pry into the nature and hidden causes of those ideas." "Substance" has not been absolutely denied existence apart from perception; but the possibility of our having anything more than the most obscure idea of it has been denied.

If our knowledge extends no further than our ideas, then in order to determine the validity of our knowledge of the external world we must examine further the nature, structure, and degree of correspondence of our ideas with the objects they are supposed to represent. We must set up standards to ensure that our ideas will be "real", "adequate" and "true." To this task Locke now logically turns.

1. Bk. II, Ch. XXIII, Sec. 29.
V. THE CRITERIA OF REALITY, ADEQUACY AND TRUTH OF IDEAS.

(1) REAL AND FANTASTICAL IDEAS.

Real ideas are defined as those which have a "conformity with the real being and existence of things, or with their archetypes." Simple ideas are all real. As far as primary qualities are concerned, Locke holds that their patterns are directly (though not necessarily photographically) represented in the corresponding ideas we have of them. The remainder of our simple ideas are not images or direct representations of what does exist, our ideas of the secondary qualities being merely indirect effects in us of "powers" in the external bodies. By means of simple ideas we know and distinguish objects. For this purpose our ideas serve us as well if they are merely constant and regular effects of qualities in the external bodies as if they were actual patterns. Simple ideas, by virtue of this steady correspondence they have with the "distinct constitutions of real beings" are therefore real and true. They cannot in any case be made by the mind at will, and hence are not fictions of our fancy.

Complex ideas are admittedly voluntary creations, mere collections of simple ideas. Which collections are real, and which only imaginary?

1. Mixed modes and relations made of consistent ideas

1. Bk. II, Ch. XXX, Sect. 1.
are real. These ideas, being framed by the mind, are
themselves archetypes, and since they cannot be referred to
any more ultimate standard cannot be said to be unreal.
The simple ideas of which the mode is composed must, however,
be mutually consistent: otherwise the mode can scarcely be
said even to exist.

2. "Ideas of substances are real, when they agree with the
existence of things." Here we must refer to experience
to judge of the reality of our ideas. If, for example, we
put together a number of simple ideas and obtain the idea of
a certain substance, but can nowhere in the external world
find a substance composed of a collection of qualities
corresponding to our collection of ideas, the concept we
formed of that substance is unreal or fantastical. Our
complex ideas of substances "are no farther real than as
they are such combinations of simple ideas as are really
united, and co-exist in things without us. On the contrary,
those are fantastical which are made up of such collections
of simple ideas as were really never united, never were found
together in any substance."

1. Bk. II, Ch. XXX, Sect. 5.

2. Locke does not inquire into the nature and validity of
a body of scientific fact such as is necessarily implied
here as the standard of reference.

3. Bk. II, Ch. XXX, Sect. 5.
(2) Adequate and Inadequate Ideas.

Having determined what ideas really have a referent in the external world (except in the case of those which are admittedly made by the mind and are not referred to anything external), we must now examine these ideas in order to discover how accurately they can mirror the structure of their referents. Those ideas are adequate "which perfectly represent those archetypes which the mind supposes them taken from." Those ideas are inadequate which are only partial or incomplete representations of their referents. Locke finds that:

1. Simple ideas are all adequate. Each sensation answers to the power operating on our senses. The idea so produced is a real idea, and "cannot be adequate, since it ought only to answer that power." The mind cannot frame or alter the simple idea, but merely receives it from without as given. Since we have no other knowledge of the referent in any case except through the ultimate simple idea, it would be logically impossible to deny adequacy of representation to it.

2. The complex ideas of substances are ectypes or copies of qualities actually existing. Such ideas cannot be adequate, however, because we cannot be sure that any collection of simple ideas, which we intend shall include all the qualities of any existing substance, exactly answers to all the qualities which are in that substance. The cause of this 1. Bk. II, Ch. XXI, Sect. 1.
inadequacy is simply the limitation of our own knowledge of the properties of any substance. We cannot have an adequate collection of all the qualities of the substance until we find all the alterations it would receive from or cause in all other substances. Thus, ideas of substances, as collections of their qualities are all inadequate. In this connection Locke rules out the idea of there being any real essence of the substance which might be a referent for our ideas. These real essences are always unknown; and hence the ideas referred to them as archetypes "must be so far from being adequate, that they cannot be supposed to be any representation of them at all." We cannot, then, have adequate complex ideas of substances.

3. Ideas of modes and relations are not referred to anything beyond themselves, but are originals and archetypes and hence must be adequate.

(3) TRUE AND FALSE IDEAS.

Locke notes that, in propriety of speech, truth and falsehood belong only to propositions. No idea insofar as it is merely an appearance in the mind can be judged to be

1. Bk. II, Ch. XXXI, Sect. 6.
true or false. "Whenever the mind refers any of its ideas to any thing extraneous to them they are then capable to be called true or false." There are four cases in which ideas may properly be called false:

1. An idea is false when judged to agree with another's idea signified by the same name, without in reality doing so. Insofar as no name is attached to the idea, there is properly nothing that can be called false, since the idea simply represents an action, substance, quality etc., actually found or imagined. But commonly accepted usage sets up standards in names. If, for example, I attach to the idea of a man who shuns danger and the fulfilment of duty the name "hero", my idea is false insofar as it does not correspond to that idea to which in propriety of speech the name "hero" belongs. Such falsity is of course only formal and conventional.

2. An idea is false when judged to agree with real existence without so doing; that is, when a complex idea is composed of such a collection of simple ones as are never found together in nature, and yet is judged to agree to some species actually existing. For example, a complex idea of a horse which was made up of the simple ideas of the shape and size of a horse, together with the idea of a power of barking like a dog, would be a false idea of a horse.

1. Bk. II, Ch. XXXII, Sect. 4.
3. An idea is false when judged adequate without being so. The complex idea may unite a certain number of ideas which do really exist together in Nature, but because of our lack of knowledge other ideas equally inseparable may be omitted. If this defective complex idea is nevertheless judged to be adequate, it is a false idea.

4. An idea is false when judged to represent the "real essence" of any body existing, when at the best it contains only a few of those properties which result from its real essence.

VI. THE EFFECT OF LANGUAGE ON OUR KNOWLEDGE OF THE EXTERNAL WORLD.

At first sight, Book III of Locke's "Essay" might seem to be irrelevant in answering the question of the nature of our knowledge of the external world. Locke himself did not share this view. He found that there was "so close a connection between ideas and words, and our abstract ideas and general words have no constant a relation to one another, that it is impossible to speak clearly and distinctly of our knowledge, which all consists in propositions, without considering first the nature, use, and signification of language." What he is saying, in effect, is that the medium by which we convey ideas and express their relations affects our knowledge of the referent of those ideas.

1. Bk. II, Ch. XXXIII, Sect. 19.
It is of course obvious that any obscurity or uncertainty in the signification of words will affect the clarity and validity of any discourse concerning knowledge. To avoid such confusion Locke gives detailed stipulations as to the necessity of accuracy of reference and constancy in meaning of words. But for our purposes the most important part of his examination of language is his inquiry into (1) the doctrines of "essences", "genera", and "species"; and (2) the nature of the simple idea.

From ideas of particular things which agree in certain respects we arrive at general ideas which contain that factor common to all the things, and which omit the circumstances of time and place and any other ideas that may determine the things to this or that particular existence. By this process of abstraction ideas are made capable of representing more individuals than one. The terms which arise in this process of abstraction are purely conventional indications of content. Thus, the terms "genera" and "species" appear on close examination to have no real existence whatever as subsistent forms. They are merely artificial creations of the understanding, which uses these class designations as signs of the content of certain of its abstract ideas. "General natures" are for Locke nothing more than complex ideas with names attached to them.

Each distinct abstract idea is a distinct "essence". The "real essence" is the real internal "constitution of things, whereon their discoverable qualities depend."

1. Bk. III, Ch. III, Sect. 15.
But it is useless to suppose that (e.g.) substances are distinguished by their "real essences"--for this is generally unknown. Things are ranked under names into sorts or species only as they agree to certain abstract ideas to which we have annexed these names. This "essence" of each genus or sort is simply that abstract idea for which the general name stands. Locke calls this the "nominal" as opposed to the "real" essence, and maintains that this nominal essence is the only one with which we can deal when we discuss substance.

A further proof that "essence" relates merely to sorts is shown by the fact that in so far as any being is considered merely as an individual nothing is "essential" to it. "Essence" involves the abstract complex idea of kind or sort. As we have seen, the real essence cannot be known. Our faculties, no matter what degree of exactness we achieve, will never carry us further toward a knowledge of substances than a collection of sensible ideas; and different collections of ideas will be taken by us as representative of different substances. The nominal, not the real essence, determines the limits of genera and species. Yet, although these nominal essences are made by the mind, their creation is not entirely arbitrary, for the mind in "putting together" complex ideas must not make such combinations as are not found in the external world.

From our knowledge of substances, then, any inquiry as to ultimate "natures" or "real essences" is banned. Locke's constant position is that our knowledge of the external
world terminates in our simple ideas and in the structure arising from them. For forms and species subsisting somehow as archetypes outside the mind Locke apparently holds no brief. Form or species for him is an artificial limit set by the understanding to indicate different content. The conventionality of forms is indicated by the fact that artificial things are of distinct species as well as natural—e.g., on Locke's theory "watch" and "clock" are of distinct species. Different collections of ideas make different species—i.e., there is no sharp cleavage between the content and the form. Examination of the meaning and function of words shows that a class name is merely an artificial indication of the content of the annexed abstract idea, i.e., essence, and cannot properly be taken to indicate the existence and thereby mislead us into discussing the reality or nature of forms, species, "general natures", or "real essences". For Locke all such terms are merely conventions necessary for our communication with one another.

Examination into the nature of language reveals an important characteristic of Locke's structural atom, the simple idea—i.e., that "the names of simple ideas" are undefinable. Locke properly remarks that it is necessary to make clear which elements in our knowledge are definable and which are not. His proof of this characteristic of the simple idea rests on two grounds:

1. A definition, he says, is the showing of the meaning of one word by several other not synonymous terms. The meaning of any term is shown when by other words the idea
denoted by that term is represented to the mind of another. Locke's argument is that, since the several terms of a definition signify several ideas, they can by no means all together represent an idea which has no composition at all. Hence the name of the simple idea cannot be defined, since definition requires a complex structure which can never represent the non-composite simple idea. In other words, the simple idea, having no form or structure whatever, is pure content, which for logical reasons can never be communicated. The bearing of this fact on our knowledge in general will be elaborated later.

2. There is no inherent connection between the sound of a word and the idea it stands for. The word as a sound produces only the idea of that sound. No further idea can be excited in us except by a voluntary connection with some other idea for which in propriety of speech that sound is taken to stand. Hence words, for example, cannot convey the simple idea of colour to a blind man, because he is unable to make this connection as a result of deficient sense experience. The name is an artificial designation of a class of appearances and has no "inherent connexion" with the content of the appearances. Content can be supplied from experience alone.

Into Locke's lengthy account of the defects of language and the corresponding remedies we need inquire only briefly. His main position is that words can be used meaningfully in discussions concerning knowledge of the external world
only when they refer specifically to some feature in the external world that can be known to us through sensation or perception—e.g., a term such as "real essence" is by these standards meaningless. To ensure that our words will denote clear and unambiguous ideas which are the same for all minds, as far as substances are concerned, we shall have to employ the methods both of showing and defining. The simple ideas of substances can be conveyed adequately only by showing. The ideas of the "powers" of substances can be conveyed most adequately by definition. Our complex ideas of substances must be rectified constantly by further research in order that they may become more adequate.

VII. THE EXTENT OF OUR KNOWLEDGE OF SUBSTANCES:

Knowledge Locke defines as the perception of the agreement or disagreement of two ideas. This agreement or disagreement is fourfold: (1) as regards identity or diversity; (2) as regards relations between ideas; (3) as regards co-existence in the same subject; and (4) as regards actual real existence agreeing to any idea. Locke maintains that these four sorts of agreement or disagreement contain all the knowledge we are capable of, for all we can inquire concerning any of our ideas comes under these heads. There are three degrees of our knowledge: intuitive knowledge, which is the clearest and most certain of all, and which cannot be examined or analysed; demonstrative knowledge, in which the mind perceives the agreement or disagreement of any two ideas not immediately but only through intermediate steps each requiring intuition; and lastly, sensitive knowledge of particular existence. Our knowledge of the external
world, despite the doubts cast on its validity, is admitted to the class of "sensitive knowledge."

The greatest and most material part of our knowledge concerning substances lies in the perception of the agreement or disagreement of our ideas "in co-existence." Our ideas of the species of substances are only "certain collections of simple ideas united in one subject, and so co-existing together". Our further knowledge of these substances is limited to the discovery of what other simple ideas do or do not co-exist with those that make up the original complex ideas. Locke finds our knowledge of substance to be severely limited, because the simple ideas carry "in their own nature no visible necessary connexion or inconsistency with any other simple ideas."

The connection between secondary qualities is similarly unknown. Neither is there any discoverable connection between any secondary quality and those primary qualities on which it depends. In one sense Locke anticipates Hume here when he declares that it is impossible to find "necessary connexion" between our ideas. "Our knowledge in all these inquiries reaches very little farther than our experience." In the same section he says:

1. Bk. IV, Ch. III, Sect. 9
2. Bk. IV, Ch. III, Sect. 10
"For, of all the qualities that are co-existent in any subject, without this dependence and evident connexion of their ideas one with another, we cannot know certainly any two to co-exist any farther than experience, by our senses, informs us. Thus though we see the yellow colour, and upon trial find the weight, malleableness, fusibility, and fixedness that are united in a piece of gold; yet, because no one of these ideas has any evident dependence or necessary connexion with the other, we cannot certainly know that where any four of these are the fifth will be there also, how highly probably soever it may be: because the highest probability amounts not to certainty; without which there can be no true knowledge. For this co-existence can be no farther known than it is perceived: and it cannot be perceived but either in particular subjects by the observation of our sense, or in general by the necessary connexion of the ideas themselves."

Besides this theoretical difficulty Locke stresses practical difficulties which lie in the way of an extension of our knowledge of substances. He says:

"I doubt not but if we could discover the figure, size, texture, and motion of the minute constituent parts of any two bodies, we should know without trial several of their operations one upon another, as we do now the properties of a square or triangle. But whilst we are destitute of senses acute enough to discover the minute particles of bodies, and to give us ideas of their mechanical affections, we must be content to be ignorant of their properties and ways of operation."

VIII. THE REALITY OF OUR KNOWLEDGE OF THE EXTERNAL WORLD.

The objection Locke has to meet here is that if all our knowledge terminates in ideas, there can be no external criterion by which to distinguish between "real knowledge" and vain chimeras. The answer to this objection was given earlier when the problem of the reality of our ideas was discussed. Locke admits that our knowledge is "real" only so far as there is a conformity between our ideas and the "reality of things." What is the criterion of conformity?

1. BK. IV, Ch. III, Sect 25.
(1) All simple ideas must agree to the reality of things. The mind cannot make them but must receive them from without. Simple ideas may not image or photographically represent the external world, but they carry with them all the conformity which is necessary, since they enable us to distinguish and use particular substances. And "this conformity between our simple ideas and the existence of things is sufficient for real knowledge."

(2) "All our complex ideas except those of substances being archetypes of the mind's own making, not intended to be the copies of any thing, nor referred to the existence of anything, as to their originals, cannot want any conformity necessary to real knowledge."

(3) The case of complex ideas of substances presents difficulty, for here the ideas are referred to archetypes in the external world. We have seen that our ideas of substances are always deficient and may represent collections of qualities not actually existing in the substances in question. The criterion of inconsistency will not prevent us from joining ideas together when the corresponding qualities are not so joined in the substances, since we can

1. Bk. IV, Ch. IV, Sect. 4
2. Bk. IV, Ch. IV, Sect. 5.
find no "necessary connexion" between our ideas. Insofar as our complex ideas agree with their archetypes, so far our knowledge concerning them is real, even though this knowledge does not, as shown previously, reach very far.

Locke reminds us that "in our inquiries about substances we must consider ideas and not confine our thoughts to names or species supposed set out by names." The doctrine that species and their essences are anything else than merely our abstract ideas with names annexed to them, he believes to be a "great obstacle to our clear and distinct knowledge, especially in reference to substances."

IX. SUMMARY

We are now in a position to summarize the answer Locke gave to the problem of the sense in which we have knowledge of the external world.

First, and all important, knowledge extends no further than our ideas, since the mind has no other immediate object except its own ideas. Of these there are two original sources: sensation, and reflection, by the latter of which it is important to note Locke means "that notice

1. Bk. IV, Ch. IV, Sect. 13.
2. Bk. IV, Ch. IV, Sect. 17.
which the mind takes of its own operations," and from which it derives the ideas of thinking, willing, perceiving, etc. In the reception of these ideas the mind is for the most part wholly passive.

The unit of knowledge is the simple idea. As we have seen, this can come only from experience. Since it is non-composite, it cannot be defined or communicated by means of language, for language employs complex structures in order to effect communication. The simple idea is undifferentiated and hence is atomic. From this elementary constituent of knowledge the mind builds complex ideas by virtue of its powers of combination, comparison, and abstraction.

Locke's insistence that the simple idea is undefinable is important for a reason already mentioned--i.e., our knowledge of the external world must be a knowledge only of structure and relations existing in the external world, insofar as our knowledge is to be communicable and hence worthy of the name. He does not specifically state, in so many words, that it is logically impossible to communicate content, but the reasons he advances to prove that the simple idea is undefinable show that he realizes this fact.

1. Bk. II, Ch. I, Sect. 4
2. Bk. II, Ch. IX, Sect. 1.
The stress on structure is further borne out by the explicit rejection of the possibility of any knowledge of "essences" or "natures" or even of substance in general, which had so long formed a part of philosophical inquiry:

"The true method of advancing knowledge is by considering our abstract ideas. We must therefore, if we will proceed as reason advises, adapt our methods of inquiry to the nature of the ideas we examine, and the truth we search after. General and certain truths are only founded in the habits and relations of abstract ideas. A sagacious and methodical application of our thoughts, for the finding out these relations, is the only way to discover all that can be put, with truth and certainty, concerning them, into general propositions. By what steps we are to proceed in these, is to be learned in the schools of the mathematicians, who, from very plain and easy beginnings, by gentle degrees, and a continued chain of reasonings, proceed to the discovery and demonstration of truths that appear at first sight beyond human capacity." 1

It must be admitted that Locke's effort to place mathematics along with everything else on an empirical basis was unsuccessful, but at any rate here is evidence of the faith in the ability of mathematical or logical analysis to discover valid relations and their proper combination in order to ensure that adequate organization of the "atomic facts" which is the task of every science.

One other consequence, which comes in part from this stress on the structural nature of our knowledge, is that

1. Bk. IV, Ch. XII, Sec. 7.
"natural philosophy" gives us what Bertrand Russell would call "power knowledge." Speaking of the limitations of our ability to obtain knowledge of the external world Locke says: "Experiments and historical observations we may have, from which we may draw advantages of ease and health, and thereby increase our stock of conveniences for this life; but beyond this I fear our talents reach not, nor are our faculties, as I guess, able to advance." If knowledge after any "essences" or "magna arcana" is declared vain, this stress on the predictive and pragmatic nature of scientific knowledge soon follows. There is a pragmatic touch in Locke's acceptance of the simple idea as real. As we noted, Locke maintains that although the simple idea may not photographically image its referent, yet the constant and dependable relation between them is all that "our state requires", since by means of this we can distinguish substances, "discern the states they are in...take them for our necessities and apply them to our uses".

Our knowledge of the structure of the external world is considered by Locke to be extremely limited. "Certainty and demonstration are things we must not, in these matters, pretend to." It is limited for theoretical reasons

1. Bk. IV, Ch. XII, Sect. 10.
2. Bk. IV, Ch. IV, Sect. 4.
because we cannot trace "necessary connexion" between the ideas we have of bodies. But it is the practical limitations which Locke is inclined to stress--e.g. the minuteness of the parts of bodies and our lack of instruments to cope with such minuteness. Such limitations, Locke would be forced to admit, are largely overcome by the techniques of modern atomic physics, which has attained a degree of insight that Locke would probably have deemed impossible.

The "reality" of our knowledge is assured in the case of simple ideas, and of all complex ideas except those of substances. In our complex ideas of substances our knowledge is real insofar as our collections of ideas agree with archetypes without us. The criterion of adequacy or inadequacy of our ideas is respectively that of complete or defective representation of their referents. Truth and falsity belong not to ideas but to propositions, since no idea qua idea is capable of truth or falsity. The detailed requirements of reality, adequacy and truth of our ideas or propositions have been outlined earlier.

Through experience, then, we are supplied with ideas corresponding to qualities existing in the external world;

1. Bk. IV, Ch. III, Sec. 26.
and by organizing these ideas into relations in accordance with certain requirements we can arrive at a limited but nevertheless real and adequate knowledge of the structure of that external world.
CHAPTER II

GEORGE BERKELEY: "A TREATISE CONCERNING THE PRINCIPLES OF HUMAN KNOWLEDGE."
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GEORGE BERKELEY: "THE PRINCIPLES OF HUMAN KNOWLEDGE."

Locke pushed his inquiry into the nature of substance scarcely further than the mere statement of the problem involved. In its origin, the philosophy of his successor, Berkeley, consists simply in a subtle and destructive analysis of this notion of "material substance." But the consequences attendant upon his severe refinement of matter led the great philosopher-theologian to develop a system of "Subjective Idealism" which represents a radical departure from Locke's general position; while the weapon of analysis that he forged in the fire of his eagerness to destroy Materialism became, in the hands of David Hume, a tool for the final transformation of Empiricism into a profoundly searching Scepticism.
I. LANGUAGE AND ABSTRACTION.

Locke had banished from discussion any such terms as "essences" or "general natures". For him "essence" meant merely "abstract idea". Berkeley, however, in his "Introduction" to "The Principles of Human Knowledge," immediately questions even the possibility of our framing "abstract general ideas". His nominalistic thesis is that all genuine knowledge of things may be individualized. Insofar as his argument rests on examples which prove the impossibility of our framing abstract images, Berkeley is obviously correct, since an abstract image of any one quality is clearly impossible. For example, I cannot form an abstract idea of color in general, since I am always forced to think of some particular color. The general abstract idea of man, for instance, is supposed to be derived by framing an idea in which all particulars of any number of individual men equally partake, "abstracting entirely from and cutting off all those circumstances which might determine it to any particular existence." This abstraction cannot be "filled out" in imagination, since every image involves a certain particular shape, colour, size, etc. It is impossible to abstract in one sense, Berkeley admits, for I can consider certain parts of a body separated from others; but then any part I consider

(All future references are to the "Principles").
must have some definite shape, colour, etc.

The belief in the possibility of framing abstract general ideas arises from the supposition "that the making use of words implies the having general ideas." But Berkeley maintains that "a word becomes general by being made the sign, not of an abstract general idea, but of several particular ideas, any one of which it indifferently suggests to the mind." In geometry, for instance, a particular line is employed in a demonstration; but it may become generalized by being made the "sign" of all particular lines whatever, and consequently what is demonstrated of it will hold for any other line. Just as a particular line becomes general because it is made a "sign", so the name "line" which by itself is particular, by being made a "sign" becomes general. Generality merely implies that particulars are indifferently denoted. Universality does not consist in "the absolute, positive nature or conception of anything, but in the relation it bears to the particulars signified or represented by it: by virtue whereof it is that things, names, or notions, being in their own nature particular, are rendered universal."

The problem of course occurs: How can that which

1. Intrad. Sect. 11. Irod.
2. Intrad. Sect. 15.
is not demonstrated of an abstract general idea, but of a particular thing, hold universally? To use Berkeley's example, if I demonstrate that the three angles of an isosceles rectangular triangle are equal to two right ones, how can I extend this property to all triangles?—for unless I can, I will have to examine every individual triangle separately in order to determine whether this property holds true of it. Must I then demonstrate this property of the "abstract idea" of a triangle? But we have agreed that it is impossible to frame such an abstract idea. The escape from this apparent dilemma is to be found in the fact that what I demonstrate of any particular triangle holds good for all triangles, provided that I do not bring into my demonstration any features of the triangle which are connected with its particular size, shape, and angles. Since the particular features are ignored in the demonstration, the conclusion can be applied universally. Berkeley concedes that a man "may consider a figure merely as triangular, without attending to the particular qualities of the angles, or relations of the sides. So far he may abstract; but this will never prove that he can frame an abstract, general, inconsistent idea of a triangle." He grants that without "abstraction" there can be no scientific knowledge of things; but by the term abstraction we can imply only exclusive attention to the common attributes or relations of individual things.

Berkeley finds, with Locke, that the source of epistemological error often lies in language. The notion of abstraction arises from the fact that in speech we have universal signs. We tend to regard these signs, or words, as having precise and settled signification or reference; and consequently come to think that there are "certain abstract, determinate ideas that constitute the true and only immediate signification of each general name, and that it is by the mediation of these abstract ideas that a general name comes to signify any particular thing." A general name, however, does not stand for one precise signification, but, as we have already seen, indifferently represents a great number of particulars. Even definition does not limit a name to one certain signification—e.g., a triangle is defined as "a plain surface comprehended by three right lines," but no restriction is placed on the size or the relations of the angles and sides to one another. Berkeley rejects the accepted opinion that every significant name necessarily stands for a corresponding idea, since this premise leads to the conclusion that certain names, which are not regarded as completely "insignificant" (i.e., meaningless), but which do not designate particular and conceivable ideas, must therefore stand for abstract notions.

1. Introd. Sect. 18.
Names need represent nothing at all, he asserts. In communication by language we may use words as we do letters in algebra, where although each letter denotes a particular quantity, it is not necessary that at every step each letter should suggest the idea of that particular quantity it denotes.

Berkeley's constant warning, here and throughout, is that we should not be misled in our inquiries concerning knowledge by the abuse of words. To seek for the meaning of any philosophical term we need simply to attend closely to the ideas that pass in our own understandings. So long as we confine our thoughts to ideas divested of the accompanying words, we can make no mistakes. Words will then be unable to impose on us the delusion that there are any abstract general ideas; and further, since we know that names do not always signify ideas, we need not look for such ideas where there are none to be found.

1. Berkeley points out with great force and clarity that words are used not only for the purposes of communication of ideas, but also to induce emotions and corresponding moods in our listeners. Originally the idea aroused by the word in its turn aroused the emotion; but habit "short circuits" this chain so that the word directly evokes the emotion. Even proper names are used to surround ideas with an authority not necessarily their own—cf. the Scholastics' practice of citing Aristotle as an indication of the truth or falsity of controversial propositions.
II. THE ANALYSIS OF MATTER.

Berkeley's famous account of the nature of matter requires little space for its presentation. Following Locke, he maintains that the objects of human knowledge are always ideas: either (1) ideas "imprinted on the senses"; or (2) such as are perceived by attending to the operations of the mind; or (3) ideas formed by comparing, compounding, abstracting or otherwise manipulating those ideas originally derived from sensation and reflection. Experience leads us to bind together in one collection certain ideas which always accompany one another. We give this collection one name, and come to regard it as one "thing".

Now it is universally admitted that any ideas formed by the imagination cannot exist without the mind. But Berkeley points out that the various sensations (i.e., ideas imprinted on the senses) "however blended or combined together (that is, whatever objects they compose) cannot exist otherwise than in a mind perceiving them." Objects are merely collections of ideas. Ideas cannot exist apart from being perceived; consequently objects must similarly depend for their existence on perception. If we give meaning to our terms, we shall see that when we say "A thing exists," we mean only, "Certain ideas have been perceived."

"The absolute existence of unthinking things without any

1 "Principles," Sect. 3.
relation to their being perceived...is perfectly unintelligible. Their esse is percipi, nor is it possible they should have any existence out of the minds or thinking things which perceive them." Berkeley, who continually poses as the champion of the views of ordinary common sense against the sophisticated doctrines of philosophers, regards the whole hypothesis of matter as depending on the doctrine of abstract ideas. Abstraction distinguishes the existence of sensible objects from their being perceived and professes to enable us to conceive objects as existing unperceived. But, like a good general, Berkeley has carefully mapped out his plan of attack, and has prefaced his whole treatise by expressly denying the possibility of such extreme abstraction. We cannot separate in thought the being of a sensible thing from its being perceived.

One objection immediately arises at this point, which might be expressed as follows: Granted that objects are for us merely collections of ideas; and granted that ideas "depend for their existence" on percipient minds; is it not yet possible that objects in themselves may exist in some unthinking substance, and that our ideas are "copies" or "resemblances" of such objects in themselves? Berkeley sees no difficulty in answering this question. An idea can

1. Sect. 3.
be like nothing but an idea; a colour or figure can be like nothing but another colour or figure. Now the supposed things-in-themselves must be either perceivable or not. If they are perceivable, they must be ideas, since we have perception only of ideas, and hence they cannot exist in any unthinking substance. But if they are not perceivable, how can ideas picture them or represent them, for an idea can be like nothing but an idea, and something not perceivable would be unlike an idea. For example, a colour cannot be like something which is invisible; "hard" or "soft" cannot apply to something which is intangible.

Another form of this objection, i.e., that external bodies may be independent of our perception of them, appears in the distinction between primary and secondary qualities. As we have seen, Locke considered that extension, figure, motion or rest, solidity and number are "really" in the external bodies "whether we perceive them or not"; whereas secondary qualities admittedly depend on our perception of them. Our ideas of the primary qualities are patterns or effects of things which exist without the

1. Berkeley takes many properties of the "idea" for granted. The belief in the existence of anything beyond phenomena of sense arises through a process of causal inference the validity of which Hume was later to attack.
mind in an unthinking substance called "matter". By "matter" is meant, on this theory, "an inert, senseless substance, in which extension, figure and motion do actually subsist." But Berkeley points out that extension, figure and motion are only ideas existing in the mind; and an idea can be like nothing but another idea. Consequently neither these ideas nor their archetypes (which are necessarily like them) can exist in an unperceiving substance. Since the above definition of "matter" is self-contradictory, the primary qualities cannot subsist without the mind in any inactive substance.

Again, it has been agreed by all that secondary qualities are sensations existing in the mind alone. If, then, we can show that secondary and primary qualities are inseparable, we shall prove, from another point of view, that primary qualities cannot exist without the mind. But this is precisely the case: for by no abstraction can I separate, for example, the extension of a body from secondary qualities such as colour. Similarly it is agreed that such terms as "great" and "small", "swift" and "slow" are relative to us and exist nowhere without the mind. Accordingly the extension which is supposed to exist without the mind "is neither great nor small, the motion neither swift nor slow, that is they are nothing at all." Number is similarly relative—e.g., "the same

1. Sect. 11.
extension is one, three, or thirty-six according as the mind considers it with reference to a yard, a foot, or an inch." Finally, the arguments by which it was shown that, for example, heat and cold are secondary qualities apply also to figure and extension. If we conclude from the fact that the same body appears warm to one hand (or person) and cold to another, that heat and cold are therefore "affections" in the mind; then we must also conclude, from the fact that the same figure appears large to one percipient being, or from one viewpoint, and small to another percipient being, or from another viewpoint that figure and extension are also existent only in the mind. In short, Berkeley's argument is that all the qualities of matter must be resolved into phenomena of sense, which presuppose for their very existence a perceiving subject.

By "material substance" the most accurate philosophers mean nothing except the idea of "being in general, together with the relative motion of its 'supporting accidents'". This "general idea of Being" is incomprehensible. The idea of "support" obviously cannot be taken to imply ordinary physical support; but no other accurate meaning can be given to this term. Even if it were possible for "solid, figured, moveable substances"

2. Sect. 17.
to exist without the mind, how could we know this? Sense brings us no such idea. Reason can bring it only by inference. But since there is no "necessary connexion" between bodies and our ideas, why need we believe in the existence of bodies without the mind? In illusory experience, such as in dreams, we do not consider that any external bodies are necessary for the production of such ideas as then occur. Why, then, in ordinary experience do we make the supposition of external bodies existing without the mind? Finally, even though the existence of bodies were assumed, we could never know how they produce ideas in us, and hence the assumption would be quite valueless. Berkeley's point is obvious: if objects of sense are "nothing but" congeries of ideas, and if ideas are merely appearances in the mind, then external objects can exist only when perceived.

III. THE EXISTENCE OF SPIRIT.

Berkeley's proof of Spirit develops directly from his theory of matter. All our ideas, sensations, notions, or whatever is before our minds are manifestly "inactive." Consequently one idea can never produce or make any alteration in another. The very being of an idea implies inertness and passivity. Extension, figure, and motion, being ideas, cannot be the cause of our sensations. It is plain, moreover, that we do have a continual succession
of ideas, since some are changed, some disappear and others re-appear. Further, there must be some cause of this change. But this cause cannot be a quality, or an idea, or a combination of ideas. "It must therefore be a substance; but it has been shown that there is no corporeal or material substance: it remains therefore that the cause of ideas is an incorporeal active substance or spirit."

The objections to this demonstration of the existence of "Spirit" are of course obvious. Material substance has been declared to be nothing more than a congeries of mental phenomena. Why then, does Berkeley assert that an incorporeal substance or Spirit is something more than a similar congeries of phenomena? The answer to this question is that he is going on the assumptions that an "idea" cannot exist without the mind; that it is inactive; and most important of all, that it must have some "cause". Berkeley conceives of mind as "supporting" ideas in the same way in which any materialist conceived of matter as "supporting" qualities. He has forbidden the materialist to seek the "cause" of ideas in matter, on the ground that there is no "necessary connexion" between the existence of bodies and our ideas. Yet he retains the search for a cause when he postulates an active spiritual substance in which ideas exist

2. Sect. 18.
and on which they depend. But to go into this matter more fully is to anticipate Hume's analysis.

"A Spirit is one simple, undivided, active being—as it perceives ideas it is called the Understanding, and as it produces or otherwise operates about them it is called the Will." Ideas, being passive and inert, cannot represent active spirit. The terms "will", "soul", and "spirit" do not stand for ideas at all, but for agents, which are not comparable with ideas and cannot be represented by them. But since we know or understand the meaning of these words, Berkeley concedes that we have some notion of spirit or mind.

It is a matter of experience that some ideas can be excited and varied at pleasure. But the ideas perceived by sense are not similarly dependent on the will. When I open my eyes, I cannot help seeing. The ideas of sense must therefore be produced by some other will or spirit. Furthermore, such ideas are "more strong, lively and distinct" than those formed by imagination; and they exhibit a "steadiness, order and coherence" which reveals their divine origin. Those set rules according to which the divine mind excites in us the ideas of sense are called by us laws of nature, and are revealed to us only through experience. We do not arrive at these laws by discovering any "necessary connexion" between our ideas but only by

1. Sect. 27.
2. But even in ordinary experience (to say nothing of hysteric-neuroses) what we see and hear is to a great extent determined by what we wish to see or hear; which is in turn determined by our respective "Apperceptive masses."
observation of nature. The "ideas imprinted on the senses" by the divine mind are called "real things." Those excited by the imagination are images of things, which they copy and represent. The fact that the ideas of sense are more strong, orderly and coherent than those created by the mind is no argument, in Berkeley's opinion, for the existence of unthinking things apart from perception.

IV. THE DEFENSE OF SUBJECTIVE IDEALISM.

Berkeley was well aware that he would have to allay the intellectual discomfort which resulted from his theory of matter. He advances and disposes of no less than fourteen possible objections to his exposition. Some of the more important of these we may briefly note.

The first objection, that his world would have nothing real and substantial in it, is essentially the one offered by Dr. Johnson, when he kicked his foot against a stone in the belief that this subtle form of procedure would disprove Berkeley. The latter, however, would not in the least deny the hardness of the stone. All he would do would be to point out that in this case the meaning of matter to Dr. Johnson was pain in the foot. The external world is perfectly real. All that Berkeley claims to deny is the reality of that vague abstraction which we call matter. He is willing to "assert the evidence of sense as high as you please." There is no need to doubt the existence of the external world. But the testimony of sense can never be offered as a proof for the existence of "material substance," 1. Sect. 40.
for this is never perceived by sense.

Again, it might be said that since we see things actually existing without us, they could not be said to exist in the mind. Berkeley's answer to this objection is found in his account of vision. Distance or "outness" is not immediately perceived by sight but is a complex judgment formed from various sense cues which we learn to gather only through experience. In reality, ideas of sight, when by them we judge distance and things placed at a distance, "do not suggest or mark out to us things actually existing at a distance, but only admonish us what ideas of touch will be imprinted on our minds at such and such distances of time, and in consequence of such and such actions." A hypothetical man who was born blind and received sight later in life would not have any conception of distance but would regard all phenomena as contained in his eye. For Berkeley the category of externality is merely a psychological judgment.

Another objection of common sense is that, since the existence of things depends solely on perception, they must disappear whenever we cease to perceive them. Berkeley turns this objection into a proof of the existence of God. It is true that objects exist only when perceived: but even when we do not perceive them the divine mind does.

1. Sect. 44.
Berkeley insists that his theory of matter does not invalidate scientific knowledge in any way. To explain a phenomenon "is all one as to show why, upon such and such occasions, we are affected with such and such ideas." In any case, phenomena are accounted for not in terms of corporeal substance, but in terms of figure, motion and other qualities—i.e., in terms of ideas.

Is it possible to argue that, if we were possessed of other senses, we would perceive matter, in the same way that a blind man given the sense of sight would perceive color? Not at all, says Berkeley; a new sense could only give us new ideas or sensations, and we would then have the same objection against their existing in an unperceiving substance as had already been brought against the existence of motion, colour, figure, etc., in an unperceiving substance.

1. Sect. 50.

2. Berkeley devotes several sections here to defending theological positions that seem to be undermined by his doctrine of matter—in particular, he has to show that the "argument from design" is not invalidated.
V. THE CONSEQUENCES OF SUBJECTIVE IDEALISM FOR PHILOSOPHY AND SCIENCE.

In his twofold capacity as ecclesiastic and philosopher, Berkeley claims to have laid once and for all the ghosts of both atheism and scepticism. As long as we suppose a "two-fold existence of the objects of sense--the one intelligible or in the mind: the other real and without the mind" then "are we involved all in scepticism." If our knowledge of the world is real only insofar as it is conformable to real things; it follows that we cannot be certain of any real knowledge at all; for if the real thing exists unperceived, we can never be assured that what we perceive conforms to that real thing. Locke's answer to this objection was made from a pragmatic standpoint. He took the view that, since we cannot create the simple idea and since it is dependable and unchanging, it carries with it an adequacy sufficient for real knowledge. But if we do away with the distinction between things and ideas, Berkeley assures us that we have immediate and adequate knowledge of reality. All our ideas are perfectly known, and nothing exists beyond them which is not perceived, since the being of anything consists solely in its being perceived. The ideas imprinted on the senses are "real things" and "really exist",

but they cannot exist apart from being perceived by mind or spirit. All inquiry into the question of representative perception is for Berkeley completely meaningless.

There are only two kinds of Being—spirits, and ideas. We cannot perceive spirits, but we do have "some knowledge or notion of our own minds, of spirits and active beings—whereof in a strict sense we have not ideas. In like manner, we know and have a notion of relation between things or ideas—which relations are distinct from the ideas or things related, inasmuch as the latter may be perceived by us without our perceiving the former." Spirits are active, indivisible substances; ideas are inert, fleeting, or dependent beings which are "supported by" these spiritual substances.

As we have seen, Berkeley felt that the expulsion of "material substance" from philosophical discussion would put an end to all scepticism and atheism. But another great source of error and difficulty with regard to knowledge remains—i.e., the doctrine of the existence of abstract ideas. Consider, for example, time, place and motion; taken in the concrete, everyone knows what they mean. But when, for instance, we attempt to frame a simple idea of time, abstracted from the succession of ideas in our minds, we become involved in absurd conclusions and insoluble problems. Abstracted from this succession of ideas, time is nothing. The duration of any finite spirit must therefore be estimated in terms of "the number of ideas or actions succeeding each other in that same spirit or mind." Time is therefore not absolute but

1. Sect. 89.
2. Sect. 98.
relative to each individual.

Just as the essence of things is percipi, so the esse of spirits is percipere. The existence of a spirit cannot be abstracted from its "cogitation." Similarly it is impossible to consider extension and motion in the abstract. In the first place, it is impossible to abstract extension from all other sensible qualities—i.e., to have an abstract image of extension; and in the second place it is impossible to abstract the entity of extension from its being perceived. Again, we cannot frame an abstract idea of happiness apart from all particular pleasure, or of goodness apart from everything that is good. It is the doctrine of abstraction which renders the study of morality also difficult and of small use. Berkeley constantly insists that we should think in concrete terms and should assign empirical meaning to our words. The beginning and the end of philosophy is the substitution of facts for empty abstractions.

Berkeley's views on "natural philosophy" are interesting. The great inducement to scepticism is the belief that "everything includes within itself the cause of its properties; or that there is in each object an inward essence which is the source whence its discernible qualities flow, and whereon they depend." But neither occult qualities nor mechanical causes, such as figure and motion, can explain the production of appearances in us. No idea, since it is inert, can ever be assigned as the cause of another idea. Berkeley makes some sharp remarks in this connection about the procedure of 1. Sect. 102.
explaining a phenomenon by merely assigning a name to
designate it. Thus it is said, for instance, that a stone
falls to the earth or that "the sea swells towards the moon"
because of the principle of "attraction." But this name
merely signifies the manner of the tendency and the effect
itself, and gives no clue as to the nature of the action where­
by the effect is produced. The task of science is to discover
"harmonies" and "agreements" in nature and to explain
particular effects--i.e., to reduce them to general rules.
Yet Berkeley still does not banish completely the idea of
causation behind events. He simply assigns efficient
causation to the will of a spirit instead of to the forces of
matter. Consequently he believes that the investigation of
final causes forms a legitimate part of science.

Berkeley takes issue with the absolute space, absolute
time and absolute motion of Newton's "Principia." Time he
has already examined. Motion he holds to be similarly
relative. If only one body existed it could not possibly
be moved, since the conception of motion demands at least
two bodies whose distance and position with respect to each
other vary; that is, the idea of motion necessarily includes
relation. In ordinary life we do not go beyond the earth to
define the place of any body; "and what is quiescent in
respect of that is accounted absolutely to be so." But
science finds that the earth moves as well as do bodies on its
surface, and in order to estimate its motion conceives "the
Corporeal World as finite, and the utmost unmoved walls or shell thereof to be the place whereby they estimate true motions." This estimate, however, gives us not the absolute motion of the earth but only its motion relative to the fixed stars. Berkeley also denies the existence of any absolute space distinct from that which is perceived by sense and related to bodies. We cannot even frame an abstract idea of pure space independent of all body. "Pure" space simply means that no resistance is offered to the movement of body. But if all body were annihilated "then there could be no motion, and consequently no Space."  

Berkeley again distinguishes between abstract ideas, which he maintains are inconceivable and non-existent, and universal ideas. Geometry does indeed deal with universal ideas, but only in the sense that the particular lines and figures in any diagram stand for innumerable others which they "indifferently denote." Since the particular length of any given line is not involved in a geometrical demonstration, that line becomes universal in its signification. Since no matter how many visible parts we assign to a line we can imagine a line which would have a greater number of parts, we consider that any line involved in a demonstration contains an infinite number of parts, in order that what is demonstrated of it will hold true for any other line whatever. The particular line existing on paper, however, does not contain an infinite number of parts. The property of containing an infinite number of parts is a property which we arbitrarily 1. Sect. 2. Sect. 116.
assign to that line in order that it may become universal in its signification. "But men, not retaining that distinction in their thoughts, slide into a belief that the small particular line described on paper contains in itself parts innumerable." The failure to retain this distinction results in the tenet that infinite divisibility of finite extension is a necessary concept for geometry. Berkeley considers that geometry, like arithmetic, is to be pursued only for the sake of whatever is useful in it. He wishes that "men of great abilities and obstinate application would draw off their thoughts" from "the more intricate and subtle parts of Speculative Mathematics" and devote themselves to "the study of such things as lie nearer the concerns of life."

1. Sect. 127.
2. Sect. 131.
VI. THE ATTRIBUTES OF SPIRITUAL SUBSTANCE.

The fact that we are unable to form an idea of spirit or mind is not to be considered as a defect in our understanding. Spirit is an active, indivisible substance. Ideas, which are inert and passive, which can be like nothing but ideas, which depend for their existence on being perceived, cannot resemble spirit, an agent existing in itself. This soul or spiritual substance Berkeley expressly identifies with the term "I". As we have noted, he admits that "in a large sense indeed, we may be said to have an idea or rather a notion of spirit," since "otherwise we could not affirm or deny anything of it." Further, just as we conceive of the ideas in the minds of other spirits by means of our own, inferring a resemblance between them, in the same way, "we know other spirits by means of our own soul--which in that sense is the image or idea of them." The soul, which is "indivisible, incorporeal, unextended" cannot be affected by bodies, which are merely passive ideas in the mind--i.e., the soul is "naturally immortal."

1. Sect. 140.

2. Sect. 140. Berkeley's manner of accounting for our knowledge of spiritual substance by asserting that we have a "notion" of it, does not exclude the possibility of our having a "notion" of material substance. also.
The doctrine of the existence of abstract ideas introduces absurdities into our knowledge of spiritual things also. Berkeley attacks the views of those philosophers who imagined that they could frame abstract notions of "powers" or "faculties" in the mind, and who professed to be able to consider these faculties apart not only from the mind or spirit itself but from their respective objects and effects as well. Needless controversies and serious errors have also arisen by the application of physical analogies in an effort to comprehend the operations of the mind.

We know the existence of other spirits only by inference from the ideas they excite in us. We know the existence of God by inference from our ideas of sense, which according to Berkeley require the postulation by our reason of a spiritual substance other than our own minds in which they subsist. God is as certainly known to exist as is our fellow human being, the existence of both merely being inferred from the existence of ideas in our minds. The problem of communication between individual minds is settled by a vague reference to the agency of God, who "maintains that intercourse between spirits whereby they are able to perceive the existence of each other."

Those occurrences in the world which do not indicate that the hand of an intelligent creator has been at work, are explained on the ground that there must necessarily be simple, general, and immutable rules of nature, in order that we may not only find guidance in the affairs of life, but also attain 1. Sect. 147.
insight into the secrets of the universe. Such immutable rules may cause "inconveniences" in nature, to use Berkeley's euphemistic expression; but they are necessary for the very existence of our reason, which could not operate if the (physical) world were chaotic. Berkeley also advances the ancient explanation "that those particular things which, considered in themselves, appear to be evil, have the nature of good, when considered as linked with the whole system of beings."

VII. THE PRELUDE TO SCEPTICISM.

A full examination of this idealism would necessarily anticipate the criticism that Hume brought against Berkeley's doctrine of spiritual substance. But even apart from Hume's analysis, which in a sense is merely the development of Berkeley one step further, there are several criticisms to be brought against Berkeley's theory of knowledge.

In the first place, the term "idea" is so amiably Protean that it is impossible to pin it down to one definite signification. Locke uses it vaguely to mean whatever the mind has before it when it thinks. But Berkeley, unlike Locke, is an enthusiast and an extremist; and when he pushes his sharp analysis to the point of denying the existence of anything except "ideas" and "spirits", it is surely time to question the meaning of "idea" very closely. Insofar as the word "idea" is a term identical in meaning with simple appearances or representations of sense, it is impossible to

define it or communicate it, as Locke pointed out. Yet Berkeley nowhere takes up the question of the importance of Locke's discovery, although communication presupposes between the external and the internal in our experience a dualism which Berkeley tends practically to abolish. It is also disconcerting to hear Berkeley saying that an idea cannot cause another idea; that an idea can exist only in a perceiving mind; that an idea can represent only that which it resembles; or that an idea is inert and passive, and so forth. Locke's thesis was that the simple idea as a mental experience was known immediately and was undefinable. But if a mental experience is undefinable and incommunicable by means of language we cannot predicate any qualities of it insofar as our thinking makes use of the forms of language. What cannot be communicated by means of language cannot be thought in terms of language. If by "idea" Berkeley means simply a mental phenomenon, then he would have to prove that a mental experience is capable of communication and hence of definition or qualification before he could say that "An idea is inert"--or indeed before he could say anything but "An idea is an idea." Yet when Berkeley is dealing with the question of the external world he does seem to use "idea" for mental appearance. On the other hand, if he were to say that "idea" means something other than plain, simple, immediately experienced content--i.e., that it is something formal and abstract--he would be going counter to his whole method. His plea is that we consider "ideas divested of words,"--i.e. he is suggesting that we 1 Sect. 22.
attempt to manipulate mental content apart from organization or form. Such a procedure if rigidly carried out would reduce thinking merely to successive presentations of sensuous imagery. (From Berkeley's remarks on mathematics, it is almost a foregone conclusion that he would regard the procedure of symbolic logic as being hopelessly abstract and therefore quite invalid as a tool for thinking.) In short, Berkeley nowhere defines the word "idea"; and yet at every turn he gives to it just those properties which are necessary for his theory. His whole argument raises grave doubts as to the ability of language to furnish thinking with a mechanism sufficiently flexible and accurate for philosophical investigation.

It is a fundamental tenet in Berkeley's theory that matter, being nothing more than assemblages of ideas, is necessarily passive, inert and powerless, and consequently is dependent on mind for its existence. This powerlessness of matter was his main argument for the natural immortality of the soul, which as an indivisible, active spiritual substance, cannot be affected in any way by inert ideas, i.e., by matter. In other words, the Mind-Body problem ceases to exist for Berkeley, since he has reduced the physical to the mental. But both Berkeleyanism and its opposite, behaviourism, which reduces the mental to the physical, accomplish their reductions altogether too easily. Berkeley, who claims to be willing to assert "the evidence of sense as high as you please," ignores entirely the evidence for the correlation between physiological processes and mental events. Physiological
disturbances in an organism—for example, a tumor of the brain—may result in overt behaviour which leads us to infer that the mental functions of that organism have been impaired. On Berkeley's theory such dependence of mind on matter is impossible. His doctrine at this point, therefore, seems to be completely at variance with the evidence of sense and of science. It is possible that such terms as "mind" and "matter" should both be dropped from philosophical discussion; but it is not possible to drop one term and retain the other without falling into absurdities.

A third objection that may be raised against Berkeley is that he does not validate his procedure even by his own standards. His plea is that we turn our minds away from empty abstractions and from misleading words, and consider only our ideas, which cannot fail to have accurate meaning for us. As already pointed out, this would reduce thinking to the mere manipulation of imagery. This procedure undoubtedly deprives the abstract term "matter" of its importance by showing the difficulty of giving it any concrete meaning. But Berkeley goes on shortly afterwards to speak of a divine mind or spirit "imprinting ideas on our senses." Thus, the tree is an idea which God imprints on my senses. Now in what concrete, conceivable way are the ideas which exist in the mind of God transferred to my mind? Berkeley's statement can claim to have no more clarity than the opposing view that material substance "imprints ideas on our senses." Neither theory is at all comprehensible or meaningful. The "notion" that can be formed of Berkeley's spiritual substance is no
clearer than the "notion" which can be formed of material
substance: precisely because, as Locke said, neither is at
all clear.

Berkeley's strong point is his insistence that it is
impossible for us to go beyond experience and still speak
meaningfully. The meaning of matter is to be found in terms
of collections of "ideas" or of concepts. If we say anything
of "matter" other than in terms whose meaning we know from
experience, we are making meaningless statements, since that
which has in no way entered into our experience can have no
meaning for us.

Berkeley denies the existence of an abstract entity
"matter" on the same grounds that common sense denies the
existence of a centaur--i.e., because neither is ever perceived
in sense experience. He finds that the proposition "Matter
exists" means merely "Something has been perceived", since
this is all the information that experience can bring to us
on this point, and since what is not contained in experience
is meaningless. Nothing can be postulated about any external
"thing" or about "matter" except in terms of what Berkeley
calls "ideas". He therefore concludes that "matter" does
not exist at all, unless by "matter" we mean "ideas". All
external bodies are, according to Berkeley, merely congeries
of ideas, dependent for their existence on perception.

Now it is true that I can postulate nothing of an
external body except in terms of my "ideas" of it. But this
negative way of stating the argument does not imply a positive
and absolute identification of the external object with
those ideas. Consider, for example, the common external object, "tree". "Tree" is the name given to a certain collection of experiences of sense. Whatever it "really" is, the tree at least represents for me sensations which in my normal experience are also possible experiences for other observers, whereas my own sensations are presumably not experienced by those observers. This fact—that what I see I consider to be capable of being seen by others—is again admittedly an "idea", in the loose sense that anything we think or say is an "idea". The tree, \( x \), has meaning in terms of mental experience, \( y \). There are however properties of the tree—e.g., its "externality"—which also have meaning in terms of \( y \), but which are not properties of \( y \). In short, an external object implies or means for me certain possibilities of sensation, or of "ideas", which do not apply to sensation itself. Consequently we cannot affirm a positive identification of external objects with ideas. It still remains true that the external object may not exist apart from perception, since it is a logical impossibility to verify existence apart from perception; but if positive identification of the object with our ideas is not proved this dependence of the external object on perception will be more doubtful. It also remains true, that, in a negative way, the external object \( x \) can mean nothing to me except in terms of sense experience, \( y \). But the fact that \( x \) has meaning in terms of \( y \) does not necessarily imply that \( x \) has existence in terms of \( y \). This \( y \) is an inescapable element present in all knowledge. It is the fact of the existence of our own conscious processes. Berkeley capitalizes on the fact that all knowledge is "filtered through" our own conscious states.
to an extent that brings him perilously close to intellectual bankruptcy.

It is clear that this objection to Berkeley, whether valid or not, involves a dualism between what is external and what is internal in our experience. The collection of experiences known as the "tree", which has certain properties that are not shared by certain other of my experiences, is said to be external, because it has those same properties (presumably) for other individuals: while the "other experiences", because they are apparently private, are said to be "internal". The common externality of physical bodies is presupposed in our communication, for if the tree is not external then neither are my fellow human beings. Nothing is easier than to question this externality, as Berkeley does, and to say that "outness" is merely a psychological judgment acquired by the co-ordination of certain visual and tactual sense experiences. But the abolition of externality carries serious consequences with it: for if everything is within my consciousness the whole world is literally my idea. Does God insure that what I see is also seen by other minds, and hence that the external world is objective and real? Not at all, for God is merely an idea in my own mind. If everything is contained within my mind, the whole creation, including God, is merely my dream. Such is the solipsistic view we are forced into if we bring everything completely within our private consciousness.

Berkeley indeed tries to avoid this consequence by making a certain concession to externality as a logical category when he says that "the things perceived by sense may be
termed 'external', with regard to their origin, in that they are not generated from within by the mind itself, but imprinted by a Spirit distinct from that which perceives them." This illuminating passage shows clearly that he can save externality and objectivity only by an appeal to God. In fact, Berkeley's proof of God is not simply a happy afterthought for the confusion of impious atheists, but an "ad hoc" hypothesis which is absolutely necessary to prevent the rest of his system from collapsing into sheer scepticism. But by Berkeley's own admission, when he reasons from sense experience to the existence of God he can do so only by a process of causal inference. If the validity of such inference is undercut, and if God is consequently denied existence, the whole system falls into chaos. Berkeley indeed endeavours to assure us, with a calm that is suspiciously like that of the captain of a sinking ship, that his doctrine leaves the reality of the external world completely untouched. But if the tree is merely an idea or a collection of ideas; if ideas exist only in perceiving minds; and if there is no external Spirit in whose mind the tree can exist, then it must be considered just as much my creation as are Oberon and Titania, centaurs and griffins, and all the other figures in mythology. Berkeleyanism, in short, is merely the prelude to Hume's intellectual nihilism.¹

¹ Concerning Berkeley Hume said—"and indeed most of the writings of that very ingenious author form the best lessons of scepticism, which are to be found either among the ancient or modern philosophers, Boyle not excepted." (Footnote at the end of Section XII, Part I of the "Enquiry").
CHAPTER III.

DAVID HUME: "A TREATISE OF HUMAN NATURE"

and

"AN ENQUIRY CONCERNING HUMAN UNDERSTANDING"
The imposing psychological edifice which had been built by the laborious and patient Locke served with only minor repairs for his two great successors. As we have seen, however, the representative realism of Locke passed over by a natural transformation into the subjective idealism of Berkeley. In David Hume this development of empiricism continues and reaches its crisis. Kantians hold that in Hume empiricism reaches not only its crisis but also its end. In Kant's own time, Hume's case was admittedly desperate, since the ponderous German philosopher effectively lined up the Aristotelian logic, the Newtonian science, and the Euclidean geometry in support of his synthetic "a priori" theory of knowledge. But in the present age advances in logic and science have replaced all three of these great systems by others, and the successful challenge to their uniqueness destroys in great part Kant's doctrine of the synthetic "a priori" judgment. Since the destruction of Kant involves to a certain extent the confirmation of the empirical position, the decisive stage to which Hume brought empiricism commands today more than a merely historical interest.
I. THE ORIGIN AND ASSOCIATION OF IDEAS.

The predilection which we have observed in both Locke and Berkeley for basing philosophy on an analytical psychology is also characteristic of Hume, the third in this brilliant group of English empiricists. The first task of philosophy is to inquire into the operations of the human mind:

"The only method of freeing learning, at once, from these abstruse questions, is to enquire seriously into the nature of human understanding, and show, from an exact analysis of its powers and capacity, that it is by no means fitted for such remote and abstruse subjects."

Hume overcomes in his use of the term "idea" some of the objections to which Berkeley is open on this ground. For him, "thoughts" or "ideas" are copies which mirror accurately but less vividly our "impressions", or more lively perceptions. Impressions and ideas resemble each other in every particular except in their degree of force or vivacity.

It is a cardinal point in Hume's theory of knowledge that "all our ideas or more feeble perceptions are copies of our impressions or more lively ones." Analysis reveals that the components of thoughts and ideas are such simple ideas as are "copied from a precedent feeling or sentiment."

Further, a defect in an organ of sense which results in the

absence of the appropriate sensation also results in the absence of the corresponding ideas. The strength and vivacity of impressions enables us to set up limits between them and prevents us from falling into any error or mistake with regard to them. Since any clear idea must have as its correspondent a vivid and clear impression, where we can find no impression from which the supposed idea is derived, we can assume that the term denoting that idea is being used without any meaning. This rigorous test of meaning obviously will have far-reaching consequences when Hume comes to employ it in his analysis of causation.

The general principles of association between ideas are reduced by Hume to three: resemblance, contiguity in time or place, and cause and effect. The examination of this last principle of association introduces us to Hume's main thesis.

II. THE NATURE OF CONCLUSIONS FROM EXPERIENCE.

In opposition to Berkeley, who tried to put mathematics on an empirical basis, Hume maintains that mathematics consists of propositions of a kind discoverable by the mere operation of thought without reference to any external existence. All such intuitively or demonstratively certain affirmations which express relations between ideas form one class of objects of our reason. In contradistinction
to this first kind of knowledge we may distinguish a second class—knowledge of "matter of fact and existence."
The truth of the propositions in this class must be determined by experience alone. Since the contrary of every proposition in this class implies no more contradiction than the original proposition, the contrary is therefore always possible, and hence reasonings from these propositions can never be demonstratively certain.

Having demarcated the spheres of mathematics and empirical science, Hume proceeds with the acumen of a philosophical genius to ferret out and analyze the essential principle on which our reasoning with regard to matters of fact proceeds. This principle, which alone makes it possible for us to go beyond the evidence of our memory and senses, is the relation of cause and effect. Even in the "Treatise", his early philosophical work, Hume shows a clear consciousness of the importance of this investigation. In connection with this examination he says:

"I think it proper to give warning that I have just now examined one of the most sublime questions in philosophy, viz.; that concerning the power and efficacy of causes; where all the sciences seem so much interested."1

Hume affirms, as a general proposition which admits of no exception, that the knowledge of this relation is never attained by a process of "a priori" reasoning, but that it arises entirely from experience. For instance, an object on

its first presentation will reveal nothing to us of its causes or effects. This proposition will be readily accepted with regard to our first experience of uncommon objects. But the same truth does not appear to be so evident in the case of familiar events the structure of which appears at first sight to be perfectly simple. We seem then to be dealing with causal series whose members we could determine by reason alone without any regard to experience. We imagine, for example, that we could infer the nature of the motion one billiard-ball would have on being struck by a second ball.

Custom, however, in cases like these is merely present to such a high degree that it conceals not only our natural ignorance but even itself as well. Given the problem of stating the effects of the operation of an unknown object, we could proceed only in the most arbitrary manner. Since the effect is totally different from its cause, it can never be discovered in the cause: "a priori", a stone might as well fall upwards as downwards. All suppositions we could make as to the effect of a given cause are equally conceivable and consistent. Only experience can tell us which one is most probably to happen. Even the solid and firm reasonings of mathematics cannot aid us here, for "every part of mixed mathematics proceeds upon the supposition that certain laws are established by nature in her
operations." Abstract reasoning either assists experience in the discovery of these laws, or determines their influence in those instances in which we can apply quantitative methods.

All reasonings concerning matters of fact are founded on the relation of cause and effect. Experience, in turn, is the foundation of all our reasonings and conclusions concerning that relation. But if we push our inquiry farther, what shall we propose as the foundation for all conclusions from experience? Hume's first answer to this question is negative: "Even after we have experience of the operations of Cause and Effect, our conclusions from that experience are not founded on reasoning, or any process of the understanding."

Our senses and reason give us knowledge of the superficial qualities of objects but fail to inform us of the "powers and principles" on which the influence of these objects depends. Notwithstanding our ignorance of these "natural powers" we always presume that like sensible qualities will be accompanied by like sensible powers, which will in turn produce effects similar to those we have already experienced. The foundation of this presumption cannot be any known connection between the sensible qualities and the secret powers, since the mind knows nothing of the nature of the latter. Proposition A:

"Object $x$ has been attended in past experience with effect $a$", and proposition B: "I foresee that an object similar

1. "Enquiry," P. 329
2. Ibid., P. 330.
to x will be attended in the future by an effect similar to a" are far from being identical. Since the connection between these two propositions is not intuitive, those who maintain that the inference is made by a chain of reasoning will have to produce that reasoning which would justify such an inference. This task Hume professes to be quite unable to perform. He utilizes again his twofold division of human reasonings, i.e., (1) demonstrative reasoning and (2) that concerning matters of fact and existence. Now since it is plainly conceivable and implies no contradiction to imagine that the course of nature may change, there can be no demonstrative reasonings in this matter, for any demonstrative arguments or any abstract reasoning "a priori" always proceed upon the principle of contradiction.

If reason, then, is to provide us with authority for this inference, its arguments must be only probable, or such as regard matters of fact and real existence in accordance with our previous division. But we have seen that all arguments concerning existence are founded on the causal relation; that the knowledge of this relation is derived entirely from experience; and that all experimental conclusions assume this conformity of the future to the past. To attempt to prove this conformity by probable arguments or by arguments regarding existence would be merely to move in a vicious circle. Further, it is clear that if this
conclusion about the future were formed by reason, it would be as perfect and complete after one instance of any event as after a number of similar instances. But Hume finds that this is not universally the case. To say that from a number of uniform experiences we infer a connection between the sensible qualities and the secret powers is simply to present the same difficulty under a different aspect, for we still have to produce the arguments on which this last inference is based. Since in the case of some objects there may be a change in the "secret nature" and in the resultant effects and influences without any change in the sensible qualities, Hume argues that we can extend this supposition of unperceived change to all objects. Experience once again can give us no safeguard against this supposition. Finally, it is a matter of common knowledge that even animals improve by experience and learn the qualities of objects by observation of the effects which result from them. As it is obvious that no profound process of argument can be at work here, it is possible to employ this argument also in support of the contention that it is not reasoning which leads us to infer that the future will resemble the past.

Neither after one instance of an event, then, nor after several, can reason give us any argument in support of the inference we draw from past to future. The only remaining principle which Hume can adduce as the explanation of this inference is merely custom or habit. The repetition of any particular act or operation simply produces a propensity in
our minds to continue in the same course of thinking. Past this principle we can push our enquiries no farther. We can give no cause of this cause, but must rest contented with it as the ultimate principle of all our conclusions from experience. After the constant conjunction of two objects we are determined by custom alone to expect the one from the appearance of the other.

"This hypothesis seems even the only one which explains the difficulty, why we draw, from a thousand instances, an inference which we are not able to draw from one instance, that is, in no respect, different from them. Reason is incapable of any such variation. The conclusions which it draws from considering one circle are the same which it would form upon surveying all the circles in the universe. But no man, having seen only one body move after being impelled by another, could infer that every other body will move after a like impulse. All inferences from experience, therefore, are effects of custom, not of reasoning."

Custom is the "great guide of human life." Without its influence we could know nothing of any matter of fact beyond what is immediately present in sense perception. Yet, although conclusions from experience carry us beyond the evidence of the memory and the senses to remote times and places, some fact must always be present to these faculties from which we first proceed in drawing our inferences. If this fact is not present our reasonings are merely hypothetical.

1. "Enquiry", P. 340
III. THE NATURE OF BELIEF.

The customary conjunction of an object $b$ with an effect $a$ produces in the mind a propensity to believe that when $a$ is given, $b$ will follow. What is the nature of this belief?

The imagination, although it cannot create ideas outside of those which are originally furnished by sensation and reflection, has an unlimited power of compounding, comparing, separating and uniting these original and primary ideas. The mind can create numberless fictions and ascribe to them any circumstances whatever. The difference between fiction and belief cannot lie in any particular idea which accompanies those conceptions which command our assent, since the mind could join that idea at will to any of its fictions and thus gain for them the status of belief. It consequently follows that the difference between fiction and belief must lie in some "sentiment" or feeling which accompanies the latter and does not accompany the former. Since it is possible to conceive the contrary of even a firmly held matter of fact, only some feeling could provide the ground of difference between the conceptions to which we give assent and the ones which we reject. This feeling cannot be dependent on the will: otherwise we could similarly join it to any fiction. It is "excited by nature" and arises in a particular situation. The whole nature of belief consists simply in a complex of conception-sentiment different from the conception-sentiment of a fiction of the
imagination.

A definition of this "sentiment" of belief is a difficult task. For Hume, belief is "nothing but a more vivid, lively, forcible, firm steady conception of an object, than what the imagination alone is ever able to attain." Belief does not consist in the peculiar nature or order of ideas, but in the manner of their conception and in their feeling to the mind. This "manner of conception" arises from a customary conjunction of the conceived object with some fact directly given by the memory or by sense perception.

Other operations of the mind analogous to this operation are to be found in the case of the three relations which govern the association of ideas—i.e., resemblance, contiguity, and cause and effect. In every instance of each of these relations it happens that when one of the related objects is presented to the senses or memory, "the mind is not only carried to the conception of the correlative, but reaches a steadier and stronger conception of it than it would have been able to attain." For example, the picture of an absent friend by its resemblance enlivens our idea of him. To produce this effect both a present impression and a relation are necessary. Again, in the case of the relation of contiguity, it is well-known that distance diminishes and approach increases the force and vivacity of any idea which has to do with a particular locality. Causation has the

1 "Enquiry," P.344.
same effect as the other two relations. The reliques of a saint are treasured because between them and the saint there is a shorter chain of causal sequence than any other causal series by which we learn of his existence. It is important, however, to recognize that these relations only have effect by virtue of a presupposed belief in the existence of the correlative object. Thus, the picture of our friend has influence on our imagination only because we believe that he once existed.

Between the course of nature and the succession of our ideas custom sets up a kind of pre-established harmony. Necessary to our very subsistence and the regulation of conduct in every sphere of activity, custom alone makes it possible for us to go beyond what is immediately given in memory and sensation. Had the inference of like effects from like causes been left to the operations of our reason, we could not have survived infancy. Such a necessary act of the mind could only have been made secure by the operation of some instinctive and mechanical tendency such as custom. Nature implants in us this mechanical habit, which carries thought forward in a course corresponding to that obtaining among external objects.
IV. THE ANALYSIS OF THE CAUSAL NEXUS.

The last great metaphysical concept which experienced refinement at the hands of philosophers was the doctrine of cause and effect. The primitive belief in causation had come down into a period as late as Hume's without any serious critical examination.

One of the best ways of gaining an insight into this belief is to abandon the philosophy of civilized Europe and to search among primitive races for the conception which is the equivalent of our idea of causation. Anthropological researches have made it clear that this equivalent among primitives is some idea corresponding to the "mana" of the Polynesians, a term which is approximated by our words "force" and "power". Mana, the source of all energy, is a vague power diffused through all nature. There are however, certain special concentration-centres of this power. Some of these special centres become the sacred totems of the primitive tribe, which felt the necessity for controlling by ritual the secret and dread forces of nature. More important for our purposes, this mana is considered as transmissible. It flows from one place or from one person to another. Thus, the mana which is in the tiger can be imprisoned in the savage by the simple expedient of eating the tiger's flesh. We would indeed regard such a belief as primitive, but there is little or no logical difference between the statement "The eating of tiger flesh will give
me bravery" and "The eating of this beefsteak will give me power." Both imply a vague belief in a sort of flowing power diffusible through all nature.

This belief persisted in Aristotle and even latently in Galileo, who tacitly assumed that power is transmitted in a course of physical events. For Newton, gravitation was a force which held his great astronomical systems together. Descartes sensed a flaw in the theory of causation, as he realized the difficulty of accounting for the interaction between physical and mental energy, but his fondness for dualism led him to leave the question unsolved. Even so keen an analyst as Berkeley does not question causation. He dispenses with the power of abstract matter, but refers efficient causation to the interposition of the will of the Deity. "Effect" still means that a "cause" has in some way added power to the situation.

At first sight, Hume's chapter on "necessary connexion" seems out of place. Why did he not deal with it in the section where he discussed the nature of conclusions from experience, for the two topics are indubitably connected? The answer seems to be that Hume realized his theory of custom as the basis of all conclusions from experience would be opposed by some appeal to an external necessity connecting physical events—in other words, by an appeal to some theory of "necessary connexion" between physical phenomena.
Accordingly he sets himself to examine terms which he expressly states are for him nearly synonymous and equally obscure—i.e., efficacy, agency, power, force, energy, necessity, connexion, and productive quality. His method is similar to Berkeley’s. In effect, he asks: "What is the clear and unequivocal meaning of this term, "causation?"

First of all, he reverts to the proposition which is the cornerstone of all empiricism—that it is impossible for us to think of anything which has not been previously experienced in either external or internal sensation. Complex ideas can be known by definition, which is simply an enumeration of the simple ideas of which they are composed. But if, after pushing our inquiries back to the simple ideas, we are still involved in obscurity, we have only one method of rendering these ideas precise and determinate, and that is, to produce "the impressions or original sentiments, from which the ideas are copied." These impressions, being forceful and vivid, will exclude all possibility of ambiguity. If, then, we want to throw light on this obscure notion of force or "necessary connexion" let us first of all find the impression from which it is derived. From what sources could this impression come?


(1) From external objects. Consideration of the operation of causes in the case of external objects never enables us to discover in any single instance whatever any power, necessary connection, or quality which binds the effect to the cause and makes it absolutely dependent on the cause. All we are conscious of in this single instance is a succession; event a, then event b. Because it is only a single case of the phenomenon, the mind feels no "sentiment or inward impression" from this external succession of objects. From the sensible qualities of no part of matter can we ever discover any power or energy which could allow us to predict a necessary result of its working. "It is impossible, therefore, that the idea of power can be derived from the contemplation of bodies, in single instances of their operation; because no bodies ever discover any power, which can be the original of this idea."

(2) From reflection. Another possible theory of the origin of our idea of power is that it is derived from reflection on the operations of the mind, and is copied from some internal impression. The influence of the will, by which we vary ideas and move the parts of our body, is known in consciousness. Hence we are supposed to arrive at the idea of power or energy.

1."Enquiry," p. 356
But Hume finds this "pretension" as unsatisfactory as the first theory. It is true that the motion of our body follows upon the command of the will, but we are absolutely ignorant of the means by which this motion is effected and the energy which makes it possible. In the first place, the supposed union of soul with body and the nature of either substance are both equally and completely mysterious. Secondly, our will has authority over some members of the body and not over others. If we were conscious of a power in the first case, we could give a reason for its absence in the second. Experience only teaches us that motion follows the command of the will, without showing us the connection between the two. Lastly, physiology informs us of such a long series of events between the act of will and the movement of the body that the nature of the power by which the whole operation is performed is quite unintelligible. It is however true that "the animal nisus, which we experience, though it can afford no accurate precise idea of power, enters very much into that vulgar, inaccurate idea, which is formed of it."  

(3) From volition. It may still be possible that we are conscious of a power or energy in our own minds when by an act of will we "raise up" a new idea, hold it for contemplation, 1."Enquiry", footnote P. 360.
and dismiss it at will. But here again it is an illusion to imagine that we have any impression from which we can derive a clear idea of power. We know neither the nature of the human soul nor the nature of an idea, and still less the relation between them. Further, if the nature of this power were known we could assign a reason for the fact that the mind can control some ideas but not others. As the matter stands we cannot. Thirdly, this power of self-command varies with physiological conditions of the body, and for these variations we can again assign no reason except experience.

The difficulty is not solved by recourse to theories of occasionalism or idealism. Although the greater part of mankind refers only unusual events to the intervention of the Deity, the philosophers of these schools refer every causal series to the interposition of the divine will. But such doctrines subvert the end they have in view and are too fanciful to carry conviction. More important, Hume points out that it is indeed true that we are ignorant of the manner of operation of bodies upon one another; but we are equally ignorant of the manner of operation of the mind. It is no more difficult to conceive that motion may arise from impulse than that it may arise from volition. As we have seen, this criticism applies particularly to Berkeley's type of Idealism.
(4) From custom. There remains only one possible source for this impression. From any single and original appearance of a natural object or event it is impossible for us to foretell without experience what effects will result from it. But after a constant conjunction of event b with event a we no longer hesitate to predict b from the appearance of a. "We then call the one object Cause; the other Effect. We suppose that there is some connexion between them; some power in the one, by which it infallibly produces the other, and operates with the greatest certainty and strongest necessity."

The idea of "necessary connexion" apparently comes, then, from a number of similar instances of the conjunction of two events. But logically a number of instances of an event provides nothing which is not evident in one instance. The only difference is that repetition induces a psychological habit in the mind, which is led by custom to expect and believe that event b will follow event a. Hume's own statements put the reasoning clearly and forcefully:

"This connexion, therefore, which we feel in the mind, this customary transition of the imagination from one object to its usual attendant, is the sentiment or impression from which we form the idea of power or necessary connexion. Nothing farther is in the case. Contemplate the subject on all sides; you will never find any other origin of that idea. This is the sole difference between one instance, from which

we can never receive the idea of connexion, and a number of similar instances, by which it is suggested. The first time a man saw the communication of motion by impulse, as by the shock of two billiard balls, he could not pronounce that the one event was connected; but only that it was conjoined with the other. After he has observed several instances of this nature, he then pronounces them to be connected. What alteration has happened to give rise to this new idea of connexion? Nothing but that he now feels these events to be connected in his imagination, and can readily foretell the existence of one from the appearance of the other. When we say, therefore, that one object is connected with another, we mean only that they have acquired a connexion in our thought, and give rise to this inference, by which they become proofs of each other's existence."

In other words, the necessity which seems to attach to physical events is a psychological not a logical necessity. The idea of causality has for its original impression that feeling which attends the operations of the mind when it considers two events which in its experience have always been conjoined. "Necessity, then, is the effect of this observation, and is nothing but an internal impression of the mind, or a determination to carry our thoughts from one object to another." "Either we have no idea of necessity, or necessity is nothing but that determination of the thought to pass from causes to effects, and from effects to causes, according to their experienced union."

This analysis provides the real basis for Hume's scepticism. All our reasonings concerning matter of fact and existence depend on the relation of cause and effect, and only by means of this relation can we proceed beyond what is present to the memory or senses. Yet we cannot even give a

3. Ibid., P.460.
definition of a cause which shows that circumstance in it
which gives it a connection with its effect.

V. SENSE PERCEPTION AND THE EXTERNAL WORLD.

With the more obvious objections which scepticism casts
upon the evidence of the senses, Hume has in this important
section little concern. The Cartesian method of doubt
he considers to be delusive, since there is no original
principle which has a prerogative above all others, and
from which we can build up by deduction a firm edifice of
knowledge. He turns his attention instead to the difficulties
inherent in the theory of representative perception.

Some "natural instinct or prepossession" carries men,
even before the use of reason, to place faith in the
testimony of sense perception and to suppose an external
universe which is quite independent of our perceptions.
In this state men suppose that the images presented by the
senses are the external objects, which are perceived directly
and in a perfectly real manner. Reflection, however, soon
destroys this opinion. The table changes shape and colour
as we change position: consequently it is not the real
table, but its image or copy which is given in perception.
Perceptions are considered by reason to be merely fleeting
copies or representations of other existences which remain
uniform and independent.
But this new system can be justified neither by an appeal to nature, for it is unnatural; nor by an appeal to reason, for this task exceeds our capacity. We cannot prove that the perceptions of the mind must be caused by external objects. In many cases we know that they do not, as for instance in mental disorders; and in any case, nothing is more inexplicable than this supposed action of body on mind. Only experience is capable of determining whether or not external objects produce perceptions in us. "But here experience is, and must be entirely silent. The mind has never anything present to it but the perceptions, and cannot possibly reach any experience of their connexion with objects. The supposition of such a connexion is, therefore, without any foundation in reasoning."  

The solutions offered by Descartes and Berkeley, of invoking the Deity to uphold the veracity of our senses, represent an inadmissible procedure. Since God can never deceive, our senses would in any case be infallible. But more important, Hume advances the objection which was set out in the chapter on Berkeley: i.e., that if the external world is once called in question, "we shall be at a loss to find arguments by which we may prove the existence of that Being or any of his attributes."  

2. Ibid., P. 435.
the external world, then, this more profound type of scepticism will always triumph; for in rejecting the views of naive Realism we adopt an hypothesis (on supposedly rational grounds) which is indefensible by reason.

Like Berkeley, Hume puts the primary and secondary qualities of matter on the same footing. The supposed "primary" qualities of extension and solidity have no more title to that denomination than have the secondary qualities of colour, hardness, etc. The assertion that the ideas of these primary qualities are attained by abstraction cannot save us from this conclusion, since this notion of abstraction is unintelligible and absurd. "An extension, that is neither tangible nor visible, cannot possibly be conceived; and a tangible or visible extension, which is neither hard nor soft, black nor white, is equally beyond

1. Hume's approach to this question in the "Treatise" is considerably more involved and abstruse. In brief, his argument is that the idea of the continued existence of body depends on the idea of identity or the principle of individuation. This principle in turn supposes both the invariableness and the uninterruptedness of any object. Now it is a principle of thought that when two ideas are associated in the imagination by the relation of resemblance one is easily mistaken for the other. Though interrupted, our perceptions do form a succession of related objects, and this succession places the mind in the same disposition, as if it were surveying an identical object. Hence we confound succession with identity. But the interruption of our perceptions seems to contradict this identity, since identity involves uninterruptedness. The perplexity arising from this contradiction is, however, disagreeable to the mind. Accordingly the imagination unites these "broken appearances" by the fiction of a continued existence. Since this propensity arises from some lively impressions of the memory, it "bestows a vivacity on that fiction; or in other words, makes us believe the continued existence of body," since belief consists merely
the reach of human conception." If all sensible qualities are, then, not in the object but in the mind, matter is annihilated, and in its place there is left only "a certain, unknown, inexplicable something, as the cause of our perceptions; a notion so imperfect, that no sceptic will think it worth while to contend against it."

in the vivacity of an idea.

But we encounter a new difficulty. "The imagination tells us, that our resembling perceptions have a continu'd and uninterrupted existence, and are not annihilated by their absence. Reflection tells us, that even our resembling perceptions are interrupted in their existence, and different from each other. The contradiction betwixt these opinions we elude by a new fiction, which is conformable to the hypotheses both of reflection and fancy, by ascribing these contrary qualities to different existences; the interruption to perceptions, and the continuance to objects." (P.502)

From this point the attack on "the philosophical system" which sets up the hypothesis of double existence and representative perception is essentially the same as in the "Enquiry". We are certain only of those existences called perceptions. From the existence of one thing to that of another we can proceed only by a process of causal inference, but this process is limited to experience. Since experience justifies us in considering a causal relation between perceptions only, we can never infer a causal relation between perceptions and objects.

VI. THE ANALYSIS OF THE EGO.

The question which Hume puts to the doctrine of the existence of an immaterial substance or soul is the same question put by Berkeley to the doctrine of matter. "I know no better method," says Hume, "than to ask these philosophers in a few words, 'what they mean by substance and inhesion?'" This question cannot be answered either with regard to matter and body or with regard to the mind or soul. Since every idea is derived from a precedent impression, if we did have an idea of the substance of our minds we would also have an impression of it. This is impossible, for an impression, because it cannot resemble a substance cannot represent it. Failure to show the impression and its source means failure to exhibit the corresponding idea with any degree of clarity; and such is the case here. Neither can a mere definition (such as Spinoza's) give any answer as to the nature of substance, for such a definition is an answer in words only. As our knowledge is absolutely confined to perceptions, we can, therefore, have no knowledge whatever of "substance" or of "inhesion" or of any similar scholastic terms.

As far as the question of the cause of our perceptions is concerned, in the "Treatise" Hume lends support to the contention of Materialism as against Idealism or occasionalism. His argument is that, since we are never conscious of any necessary connection between causes and effects, when we
consider the matter "a priori", anything may be the cause of anything. Since all real objects are thus capable of a constant conjunction, the question of which objects are conjoined is purely a matter for experience to verify. It is true that we can find "no manner of connexion betwixt motion or thought"; but this proposition applies to all causal correlates. And in the case of some perceptions, experience does lead us to infer a connection between thought and motion, for the different states of the body produce a corresponding change in one's thoughts and sentiments.

The notion of personal identity also dissolves under Hume's "impression test." We have no idea of any self, the doctrines of some philosophers to the contrary. We cannot have a clear idea of self before we can find the corresponding impression, and yet to seek for such an impression is obviously absurd. Since the self is supposed to exist unchanged, any impression of it must be similarly unchanged. Yet we have no such constant impression. Again, how are our other perceptions connected with this ego or self?

Hume finds that, "for my part, when I enter most intimately into what I call myself, I always stumble on some particular perception or other, of heat or cold, light or shade, love or hatred, pain or pleasure. I never can catch myself at any time without a perception, and never can observe anything but the perception. When my perceptions are remov'd for any time, as by sound sleep; so long am I insensible of myself, and may truly be said not to exist. And were all my perceptions remov'd by death, and cou'd I neither think, nor feel, nor see, nor love, nor hate after the dissolution of my body, I shou'd be entirely annihilated, nor do I conceive what is farther requisite to make me a perfect
The self is "nothing but a bundle or collection of different perceptions, which succeed each other with an inconceivable rapidity, and are in a perpetual flux or movement." There is no simplicity or identity in the mind. It is a kind of theatre, across the stage of which perceptions pass and repass in endless forms and combinations; "nor have we the most distant notion of the place, where these scenes are represented, or of the materials, of which it is compos'd." In another passage, Hume speaks of the mind as "nothing but a heap or collection of different perceptions, united together by certain relations, and suppos'd, tho' falsely, to be endow'd with a perfect simplicity and identity." A thinking being is merely a "connected mass of perceptions." "The identity, which we ascribe to the mind of man, is only a fictitious one, and of a like kind with that which we ascribe to vegetables and animal bodies." This fiction by which we create the notion of the identity of the self is similar in its construction to the fiction by which we conceive of the continued existence of body. Since memory is the only faculty which acquaints us of the continuance and extent of our succession of perceptions it must on that account be considered as the chief source of the notion of personal identity.

2. Ibid., P.535.
3. Ibid., P.495.
4. Ibid., P.540.
5. See footnote, PP.91-92.
VII. "A MITIGATED SCEPTICISM."

However sincere or insincere Hume may have been in his philosophical scepticism, it is beyond doubt that he never advocated the carrying of the result of these researches into ordinary life. Practice refutes the doubts which reason casts on the validity of our inference from past to future. Experience is the great guide of life, and to act contrary to the precepts it gives us is simply to play the fool. Philosophical scepticism cannot undermine "nature", which will always prevail over any abstract reasoning whatsoever. The principle of custom by which we proceed in reasonings concerning matters of fact and existence "will preserve its influence as long as human nature remains the same." Action and employment will subvert Pyrrhonism or excessive scepticism, and leave in its place a mitigated scepticism which will limit our enquiries to conform with the narrow capacity of our understanding.

It is a favorite practice to refute a philosopher's doctrine by pointing out inconsistencies in it. This is nowhere easier to do than in the case of a professed sceptic, for at first sight it seems as if a sceptic must inevitably contradict himself and destroy his own argument. He uses reason to arrive at a conclusion which destroys the validity of reason. How then does he know that his original process of thought was valid, since it was itself a product of

1. "Enquiry", P. 338
reason? Further, great philosophers have affirmed that absolute scepticism is impossible. Thus, Descartes found that he could doubt everything but the fact of his doubting, which fact he accordingly made the basis of his system. St. Thomas Aquinas stated this truth in yet another form in his aphorism:

"Etiam qui negat veritatem esse, concedit veritatem esse; si enim veritas non est, non verum est non esse veritatem."

It is, however, not true that all such arguments against scepticism are sound. For example, consider the well-known case of Epimenides the Cretan's saying, "All Cretans are liars." Since Epimenides, who says this, is himself a Cretan, we are supposed, in Berkeley's phrase, to be "involved all in scepticism." But modern logic does not accept this traditional reasoning, and considers an argument like this to be an example of the "vicious circle fallacy." Logicians consider that "All Cretans are liars", when used in this manner is strictly a meaningless proposition, so that the whole argument becomes non-sense. We need not, therefore, assume that other similar arguments against scepticism are valid: perhaps some subtle logical fallacy lies hidden in them also. In fact, it is well-known that even the great mathematical genius Descartes committed a logical fallacy in

"What Epimenides said cannot be either true or false for the simple reason that it is not a proposition but merely a string of words."
his "Cogito, ergo sum", which is in reality a psychological, not a logical argument, and it has been shown that his ontological argument involves yet other fallacies. These considerations cast doubt on the validity of this common charge against Hume's scepticism. But in any case, the scepticism which Hume advances is probably not of a kind to be affected by such a charge. All that he claims to do is to show that reason does not justify our main premise in all non-mathematical thinking: i.e., that the world is a unity, bound by laws which inevitably assure the similarity of the future to the past. We must proceed on this premise, since no other one would make our venture even possible, but we cannot justify our procedure on rational grounds.

In this same vein, it has further been urged against Hume that his whole philosophy demonstrates the activity of that thinking self the existence of which he professes at the conclusion of his "Treatise" to deny. I think it must be admitted that Hume is at his weakest in the chapter on personal identity. On his principles, he is perfectly right in deducing that we have no knowledge of the self, if indeed there is one. But after establishing this, he tries to account for the reasons which lead us to believe in this identity. Here we have noted his explanation that it is the

1. Ushenko, op.cit., P.163:
   "An interesting example of petitio principii is Descartes' ontological proof of God's existence, taken together with his comments about this proof."
memory which unites perceptions and gives us the notion of identity. What is this "memory"? The mind is nothing but a heap of impressions; is memory part of the mind, and therefore only an impression, or is it "apart from" the mind? Hume admitted later that he could not "explain the principles, that unite our successive perceptions in our thought or consciousness. I cannot discover any theory, which gives me satisfaction on this head." Reviewing his own account, he says: "But upon a more strict review of the section concerning personal identity, I find myself involv'd in such a labyrinth, that, I must confess, I neither know how to correct my former opinions, nor how to render them consistent." The confusion of both Locke's theory of the tabula rasa and Hume's account of the self lend point to Leibniz's famous addition to the empiricist dictum: "Nihil est in intellectu quod non fuit primum in sensu—nisi intellectus ipse." The empiricist analysis does seem to reduce mind to a heap of perceptions, and then there is no putting it together again. The sad fate of Humpty Dumpty is a case in point here.

This apparent defect in the procedure of analysis has of course been made the basis of a further attack on Hume. Analysis is said to distort reality. Of course, the idea of distortion, we could say like good Hegelians, involves

2. Ibid., P. 558.
the prior idea of non-distortion. How do we know that reality is distorted (or mirrored) by any view, until we know first what reality is—or, more important, if it is? Is "reality", as some have suggested, merely a name, like "matter", "substance", or "universe"? Whatever the case, we do find this polemic against the procedure of analysis. Goethe in his "Faust" puts it as forcefully as possible:

"Wer will was Lebendigs erkennen und beschreiben,
Sucht erst den Geist heraus zu treiben,
Dann hat er die Theile in seiner Hand,
Fehlt leider! nur das geistige Band,
'Encheiresin naturae'nennt's die Chemie,
Spottet ihrer selbst und weiss nicht wie."

Certainly it appears that even in philosophy, when we analyse a unity such as the mind seems to be, we lose the unity in the act of analysis.

Since we do not know what reality is, we cannot of course say whether analysis or intuition gives a "truer" view of the world. But a study of the nature of communication will show us what sort of knowledge about reality either one is capable of conveying. And here we can say not only that analysis gives us that type of knowledge which is communicable, but that any communicable proposition, because it is communicating form and not content, is capable of analysis. It is not too much to say that communicable knowledge is analytical knowledge. The mystic, on the other hand, asserts with equal right and probability that his insight into

1. "Faust" Part I, ll. 1936-41
Reality is just as valid as the logician's. Here is the ground of his complaint against analysis; for, since his insight cannot be given form, it is absolutely incommunicable. If he tries to communicate it (i.e., analyse it) he finds that an analytical procedure is quite incapable of conveying that insight. In this view he is correct, for the net of analysis does not catch the insights of mysticism. But when the mystic asserts that his view of reality is truer than the scientist's, he is entering the realm of communicable knowledge and logical discourse, and must submit his case to the most authoritative and best established laws of that realm. Here he will never find, and can never find, any support for his contention. Both ways of approaching reality, are, as a matter of fact, "abstractions." Neither can ever claim superiority over the other, for there is no common standard of appeal.

Another criticism brought against Hume in the light of Kant's "Critique" is that Hume confuses the order of nature with the necessity of causation. This objection would admit that it is possible to conceive of the course of nature as changing, but that we cannot imagine a cause occurring without some effect. In other words, causation is a universal and necessary category of thought, and rightly holds a place in Kant's list of "a priori" concepts.

From a purely formalistic point of view I think Kant does in a sense answer Hume. Consciousness implies change. As Hobbes said, "to perceive the same things always and not
to perceive at all reduce to the same thing." Now change in its turn must imply at least two events in temporal relation, one of which we define as cause and the other as effect. Since experience requires the consciousness of change as its prior condition we can predict that all future experience will be given in terms of the category of cause and effect. But of what importance is it to know this? Scarcely any. It involves no contradiction whatever to conceive that event C instead of event B will follow event A on its next occurrence. Since Kant could not deny this, we may assume that the category of causality as he lays it down—which as a category is supposed to be an absolutely necessary form of thought—does not exclude the possibility of the nonconformity of the future course of nature to the past. For Kant, the forms of thought determine the characteristics of phenomena, but since obviously no form of thought requires us to believe that the future will resemble the past, it is possible that such a change in nature might enter into our experience. And this really was the essential point of Hume's criticism. Were there some necessary bond or casual nexus between events, we might be assured of uniformity. But even Kant does not claim to discover such a material factor in causality. His argument is purely formal, and from the viewpoint of science quite barren of results. No formal argument can assure us that the future course of events will resemble the past except insofar as they will be ordered in terms of the category of
causality. In this sense causality is even for Hume a "necessary" conception, for he explicitly affirms that causation is and must be the cornerstone of all our conclusions from experience.

The consequences and implications of Hume's analysis require from a student of philosophy a long period of intellectual acclimatization before they can be fully realized. Everyone would call the following beautiful description of the relation between the moon and the ocean poetical:

"Still as a slave before his lord,
The ocean hath no blast;
His great bright eye most silently
Up to the moon is cast--

If he may know which way to go,
For she guides him smooth or grim."

But it is only after a long process of accustoming oneself to Hume's way of thinking that one sees anything remotely poetical in this statement: "The tides are caused by the gravitational pull exerted by the moon on the earth."

Hume has shown conclusively that the implied notion of force is an unsophisticated and unjustified projection from what is experienced to what is not experienced. Such anthropomorphism is unnecessary for science, provided we give up the delusive attempt to answer the question "Why?" of any phenomenon. For example, in this case all we can attempt to do is to state the observed relations between the position and revolutions of the moon and the movement of the tides. Hume constantly stresses this limitation of our enquiries:
"While we cannot give a satisfactory reason, why we believe, after a thousand experiments, that a stone will fall, or fire burn; can we ever satisfy ourselves concerning any determination, which we may form, with regard to the origin of the world, and the situation of nature, from, and to eternity?"

CHAPTER IV.

JOHN STUART MILL: "AN EXAMINATION OF SIR WILLIAM HAMILTON'S PHILOSOPHY."
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I. THE SCOTTISH "COMMON SENSE SCHOOL."

After the decisive stage to which Hume brought philosophy there were only two courses left for succeeding thinkers. The German philosophers, on the one hand, made a supreme attempt to get knowledge completely off an empirical basis. They endeavoured to sift consciousness in order to reach the "a priori" principles according to which the mind constructed knowledge. Granted the possibility of the existence of synthetic "a priori" knowledge, it was a legitimate procedure at the time, but in the present age its foundations have been undermined. The second possibility was to accept the conclusions which Hume had drawn from the prevalent empirical psychology, and to realize that, if our knowledge was dependent on experience, it could not after all transcend experience in any postulation of substances or of a unifying bond between phenomena. English and American philosophers, in the main, have tried to develop Hume. Their concern has been to refine further the various theories of our knowledge of the external world, and to seek some principle which would enable them to reconstruct the mind from Hume's chaotic "heap of perceptions" into some semblance of unity. In this connection the famous association psychology was developed and carried to the point where its hypotheses became capable of scientific verification. It has been pointed out that even the modern conditioned response theory simply attempts to provide a neurological reference for the principles of association which these nineteenth century thinkers
formulated.

The so-called "Scottish School" professed to solve the question of the existence of the external world by an appeal to common sense and to the universal sentiment of mankind in order to undercut the sophistries in which metaphysicians had involved the subject. They maintained, in general, that consciousness attests directly the fact of an ego and of a non-ego in experience. It will help to set the theory in a clearer light if we quote some passages from Sir W. Hamilton, who in spite of his inconsistencies represents the general point of view of the "introspectionist" school.

"We are immediately conscious in perception," says Hamilton, "of an ego and a non-ego, known together, and known in contrast to each other...In this act I am conscious of myself as the perceiving subject, and of an external reality as the object perceived; and I am conscious of both existences in the same indivisible moment of intuition...The ego and non-ego—mind and matter—are not only given together, but in absolute co-equality. The one does not precede, the other does not follow; and in their mutual relation each is equally dependent, equally independent. Such is the fact as given in and by consciousness."

1. Two variant theories may be noted briefly. Thomas Reid (1710-1796) held a theory of "natural signs". "The external object is always said to be perceived through the medium of 'natural signs': these signs being our sensations, interpreted by a natural instinct." (Mill, "An Examination of Sir W. Hamilton's Philosophy," P.214.) Our sensations, by a natural process of suggestion, give us the conception and the belief of the existence of the external object. "Nature hath established a real connexion between the signs and the things signified, and Nature hath also taught us the interpretation of the signs—so that, previous to experience, the sign suggests the thing signified, and creates the belief of it." (Reid, "Inquiry into the Human Mind," (Works) P.131; apud Mill, op.cit., P.217.)

Thomas Brown (1778-1820) considered that we have, on the occasion of certain sensations, an instantaneous and irresistible conviction of an outward object. "The mental modification which we experience from the presence of an object, raises in us an irresistible belief that the object exists." (Mill, op.cit., P.198.) Brown claimed that this was an instinctive belief implanted by Nature.

The various hypotheses of representative perception are dismissed outright:

"We are conscious of no reference, of no representation: we believe that the object of which we are conscious is the object which exists."

Hamilton affirms further, that we have not only a direct intuition of the reality of matter but also of its primary qualities—extension, solidity, figure, etc.:

"The developed doctrine of Real Presentationism, the basis of Natural Realism (the doctrine of the author himself) asserts the consciousness or immediate perception of certain essential attributes of Matter objectively existing...We have not merely a notion, a conception, an imagination, a subjective representation—of Extension for example—called up or suggested in some incomprehensible manner to the mind, on occasion of an extended object being presented to the sense; but that in the perception of such an object we really have, as by nature we believe we have, an immediate knowledge of that external object as extended." 2  "It is truly an idle problem to attempt imagining the steps by which we may be supposed to have acquired the notion of Extension, when, in fact, we are unable to imagine to ourselves the possibility of that notion not being always in our possession." 3

Any thinker after Berkeley and Hume who held such views was of course an easy victim for the acute Mill. There is no need to examine his refutation of Hamilton's various positions, or to enter on a description of Hamilton's tedious and detailed classification of the different theories which had been advanced on the subject of our knowledge of the external world. Mill comes right to the point at issue.

The difficulty does not lie in any dispute over the validity of the testimony of consciousness, since such a dispute is impossible. The point of controversy is the decision as to what consciousness does testify to. Introspection can show us beliefs which are accompanied by varying degrees of difficulty in accommodating thought to a different view of the subject, but mere introspection can never prove that certain of these beliefs are intuitive. In contrast to the metaphysical method of introspection, Mill distinguishes a second method, the psychological, which he employs in his own clear theory of the source of our belief in an external world.

In endeavouring to ascertain just what consciousness does give us, we have two possible courses, corresponding to these two theories. We can, first, determine precisely what the ideas now are, find out what consciousness actually tells us, and then proceed to frame a theory which shall account for the origin of the remaining content of any mental phenomena. Alternatively, we can follow Locke, and begin by examining the origin of our ideas. Mill affirms that this second method is the only possible one, and that the first is deceptive in its promises. Consider, for example, the very question at hand, that of the existence of the external world.

1. In Mill's sense, where it is contrasted with "psychological."
It is true that if we could ascertain the content of the first consciousness in an infant, "whatever was present in that first consciousness would be the genuine testimony of Consciousness, and would be as much entitled to credit, indeed there would be as little possibility of discrediting it, as our sensations themselves. But we have no means of now ascertaining, by direct evidence, whether we were conscious of outward and extended objects when we first opened our eyes to the light. That a belief or knowledge of such objects is in our consciousness now, whenever we use our eyes or our muscles, is no reason for concluding that it was there from the beginning, until we have settled the question whether it could possibly have been brought in since. If any mode can be pointed out in which within the compass of possibility it might have been brought in, the hypothesis must be examined and disproved before we are entitled to conclude that the conviction is an original deliverance of consciousness." 1

The introspectionist theory is consequently of no avail in the present inquiry. We must fall back on the psychological method, and with an adequate knowledge of the modes of generation of those mental facts which are admittedly not intuitive, discover whether it is possible from such psychological principles to frame a theory of our belief in the external world which will remove that belief from the realm of intuitive facts.

II. THE PSYCHOLOGICAL THEORY OF THE BELIEF IN AN EXTERNAL WORLD.

The chapter in J.S. Mill's work which bears this title represents the core of his theory of our belief in the external world. The essential points are not original with Mill himself. His theory is a combination of Berkeleyanism developed to a point where that form of Idealism receives a sounder exposition, and of the association psychology, founded

by Hartley and largely completed by James Mill. Against the various forms of the intuitionalistic theories, Mill attempts to show that our belief in the external world is an acquired product.

His premises are only two in number. The Psychological Theory postulates, first, that the human mind is capable of Expectation: i.e., that after experience of actual sensations, we can form the conception of possible future sensations which we would feel if certain conditions were present. It postulates, secondly, the laws of the Association of Ideas, which are four in number:

(1) Similar phenomena tend to be thought of together.

(2) Phenomena which have either been experienced or conceived in close contiguity to one another, tend to be thought of together, such contiguity being of two kinds, either (a) of simultaneity, or (b) of immediate succession.

(3) Associations produced by contiguity become more certain and rapid by repetition. When two phenomena have been very often experienced in conjunction and have never occurred separately either in experience or thought an "Inseparable Association" is produced between them. Such an association is not inevitably indissoluble, but so long as there has been no experience of thought which runs contrary to this association, it is irresistible.

(4) When the bond between two ideas is thus firmly riveted, the facts or phenomena corresponding to those ideas finally
come to seem inseparable in existence. "Things which we are
unable to conceive apart appear incapable of existing apart;
and the belief we have in their co-existence, though really a
product of experience, seems intuitive." In the case of
sight, for instance, "we see artificially that what we see is
a book, or a stone, each of these being not merely an
inference, but a heap of inferences, from the signs which
we see, to things not visible." Granted these premises,
Mill attempts to show that the order of our sensations and
of our reminiscences of sensation inevitably generate other
associations which are the source of our apparently intuitive
belief in an external world.

When we say that an object which we perceive is "external"
to us, we mean that in our perceptions there is concerned
something which does not depend for its existence in any way
on our thinking of it. This idea of something which is
distinguished from our fleeting impressions by an invariable-
ness, a "perdurability", and by an independence of our
awareness of it, constitutes our notion of external substance.
This complex conception, according to the Psychological
Theory, is simply "the form impressed by the known laws of
association, upon the conception or notion, obtained by
experience, of Contingent Sensations."  

1. Ibid., P. 226.
2. Ibid., P. 227.
For example, I have an experience of an external object, \( x \), at a certain point in space and time. When I change my own position in space, that phenomenon is no longer present to me; but all my past experience leads me irresistibly to suppose that, given the same set of antecedent conditions, if I were to return at any time to that place I should once again have the same experience. In my conception of the external world my present sensations, being transitory and fugitive, play a smaller role than does this belief I have in a countless variety of possibilities of sensation. Experience constantly confirms me in my belief of the permanence of these possibilities. As permanent, they need a special name to distinguish them from ordinary sensation, and by a "familiar experience of our mental nature" the distinguishing name ("Matter"), although it applies only to sensation regarded in a certain aspect, comes to be considered as entirely different from sensation.

These "guaranteed possibilities" of sensation have further important characteristics. In the first place, "they have reference, not to single sensations, but to sensations joined together in groups." The notion of body conveys to us not the idea of some one sensation, but of a great number and variety of sensations, all linked together by association, so that the presence of one immediately suggests the possible presence of all the rest. Since any sensation in the group
announces equally strongly the possible presence of any other, the group as a whole presents itself to the mind as permanent, in contrast both to the temporariness of our physical presence and to the temporary character of each of the sensations composing the group. This phenomenon suggests to us the notion of a substratum. Secondly, these groups of possibilities are always given to us in a fixed order of succession which, when ascertained by observation, gives rise to the idea of cause and effect. Our ideas of causation, power, activity "become connected not with sensations but with groups of possibilities of sensation." 1 We learn to think of Nature "as made up solely of these groups of possibilities, and the active force in Nature as manifested in the modification of some of these by others." Although our sensations are the original foundation of our whole belief, we come to regard these "Permanent Possibilities" as the very realities of which sensations are only the effects in us, and as intrinsically distinct from them. Finally, our experience of the independence of these possibilities on our individual wills is confirmed by the testimony of our fellows. Other people do not have our sensations; consequently these come to be regarded as dependent on us. But they do have the

1. Ibid., P.230
same possibilities of sensation:

"This puts the final seal to our conception of the groups of possibilities as the fundamental reality in Nature. The permanent possibilities are common to us and to our fellow-creatures; the actual sensations are not. That which other people become aware of when, and on the same grounds, as I do, seems more real to me than that which they do not know of unless I tell them. The world of Possible Sensations succeeding one another according to laws, is as much in other beings as it is in me; it has therefore an existence outside me; it is an External World."

Such a theory of Matter as a "Permanent Possibility of Sensation" obeys the scientific principle of parsimony, and if correct is therefore to be preferred to the introspective method, which postulates an unknown cause to account for the belief in an external world. This conception of Matter includes the whole meaning attached to it by the common world. It might be objected, however, that since the existence of a perdurable basis of sensations, distinct from sensations, is a common conception, the very existence of such a basis is proved by the fact of belief in it. But even aside from the fact that we tend to infer difference of things from difference of names, it is possible for the Psychological Theory to account for this notion of an existence transcending all possibilities of sensation. Consciousness, which recognises a difference between one sensation and another, enables us to form a general notion of difference. Since this feeling of difference is inseparably associated with every sensation we have, we arrive at a stage where we can no longer conceive anything without being compelled to form also the conception of something different from it. 1. Ibid., P.232.
"This familiarity with the idea of something different from each thing we know, makes it natural and easy to form the notion of something different from all things that we know, collectively as well as individually." Our conception of such a thing is negative: but then our idea of substance apart from any relation to our impressions is a merely negative one. We then submit to the tendency to mistake mental abstractions for substantive realities. This propensity to substantialize the Permanent Possibilities of Sensation is further strengthened by "that universal law of our experience which is termed the law of Causation."

We learn in our thought to connect everything with some antecedent condition or cause. Having found that this relation subsists between every individual item of our experience and some other item, we believe that the same relation must subsist also between our experience as a whole, and something not within the sphere of experience. We then consider the "aggregate whole of our sensations" as deriving its origin from antecedent existences transcending sensation. The idea of cause comes to be identified not with sensations as actually experienced but with their Permanent Possibilities.

It might be objected, further, that the Psychological Theory gives no explanation of our belief in the externality

1. Ibid., P. 236.
of these Permanent Possibilities. But the very idea of anything out of ourselves is derived solely from the knowledge experience gives us of the Permanent Possibilities. While our sensations depend for their nature and very existence on us, the existence of the Permanent Possibilities of Sensation has nothing to do with our presence or intellectual activity. More important, they are and will continue to be Permanent Possibilities of Sensation to other beings besides ourselves. It is from this contrast between our actual sensations and the Permanent Possibilities that the idea of externality itself is derived.

III. THE PSYCHOLOGICAL THEORY APPLIED TO OUR BELIEF IN MIND.

The claim that consciousness gives us an intuition in perception of a Non-Ego has been dismissed by Mill as fallacious. The problem of our belief in an Ego or Mind still remains. Does this belief admit of an analysis similar to that of our belief in the Non-Ego?

Our notion of Mind, as well as of Matter, is the notion of a permanent something, contrasted with the perpetual flux of the mental states which we refer to it. This attribute of permanence can quite readily be resolved into a belief of a Permanent Possibility of mental states. Up to a certain point, then, we might seem able to regard Mind as "nothing but the series of our sensations (to which must now be added our
internal feelings), as they actually occur, with the addition of infinite possibilities of feeling." Such a theory cannot be objected to on the grounds that it denies all evidence for the existence of my fellow creatures. This evidence admittedly rests on a process of inference, since no intuitionist includes other minds in his category of objects known by direct intuition. I am conscious in myself of a series of facts connected by a uniform sequence: (1) modifications of my body; (2) feelings; (3) outward behaviour. In the case of other human beings my senses inform me of the first and last parts of this series, and of a dependable connection between them. Experience forces me to postulate the middle link. I make the generalization that the modifications of a body closely resembling mine call up a world of sensations in a corresponding consciousness, and this inductive hypothesis is confirmed by all other facts within my reach. Such a logical process "loses none of its legitimacy on the supposition that neither Mind nor Matter is anything but a permanent possibility of feeling." Nor does the Psychological Theory destroy any similar evidence for the existence of God and of immortality at all.

Although the extrinsic objections to the theory are easily met, there are certain intrinsic difficulties which are beyond the power of metaphysical analysis to remove. In

1. Ibid., P. 242.
2. Ibid., P. 244.
addition to present mental states and possibilities of mental states, the "thread of consciousness" consists as well of memories and expectations. Here we come to the shoal on which Hume was admittedly stranded. In themselves, memories and expectations are only present feelings, and resemble certain sensations and feelings of which we have had prior experience. A sensation involves only a belief in its own present existence, "but a remembrance of sensation...involves the suggestion and belief that a sensation, of which it is a copy or representation, actually existed in the past: and an expectation involves the belief, more or less positive, that a sensation or other feeling to which it directly refers, will exist in the future." Now these phenomena can only be adequately expressed by saying "that the belief they include is, that I myself formerly had, or that I myself, and no other shall hereafter have, the sensations remembered or expected." If we are to speak of the mind as nothing but a series of feelings, we shall have to grant that it is a series of feelings which is aware of itself as past and future. We must either accept this paradox, or believe that the Mind is something different from any series of feelings or possibilities of them. The real incomprehensibility is "that something which has ceased, or is not yet in existence, can still be, in a manner, present: that a series of feelings, the infinitely greater part of which is past or future, can be gathered up, as it were, into a single present conception, accompanied by a feeling of reality." This incomprehensibility

1. Ibid, P.247
2. Ibid, P.248.
is an ultimate fact which we can only accept as inexplicable.

IV. THE PSYCHOLOGICAL THEORY OF THE PRIMARY QUALITIES OF MATTER.

An important part of the Psychological Theory of our belief in an external world is its explanation of the source of our distinction between the primary and secondary qualities of matter, and of the generation of our ideas of the former. Mill observed in a previous chapter that the sensations which correspond to the Primary Qualities are always present when any part of the group is so; while colours, tastes, smells, etc., being more fugacious and varying with different persons are not conceived as being always present in the external body. Since the sensations answering to the Secondary Qualities are only occasional in their occurrence and those answering to the Primary are constant, we attribute greater objectivity to the latter. We consider the sensations corresponding to the Secondary Qualities most frequently in relation to the subject; and those answering to the Primary in relation to some group of Permanent Possibilities of Sensation. It is of course possible for us to consider all or any of our sensations in relation to their objects--i.e., "to the permanent groups of possibilities of sensation to which we mentally refer them." But certain sensations--notably those of pleasure and pain--have more importance to us as forming part of our "thread of consciousness" than considered as marks of something beyond our sensations, so
that the reference of them to an object does not play so
conspicuous and predominant a part as in the case of other
sensations. Those other sensations, which are not to any
great degree painful or pleasurable, we habitually think
of as proceeding from objects.

Resistance, extension, and figure—sensations which on
Mill's theory are referable to the sense of touch and to the
muscles—become in our experience the leading and conspicuous
elements in all the groups of possible sensations. They
form a group within a group: "a sort of inner nucleus,
conceived as more fundamental than the rest, on which all the
other possibilities of sensation included in the group seem
1 to depend." Consequently our conception of Matter finally
comes to consist of resistance, extension, and figure as
essential constituents.

According to the Psychological Theory, resistance,
the most fundamental primary quality, is only a name for a
sensation composed of muscular and tactual elements. The
muscular sensation in the contraction of the arm, for instance,
varies according as the consequent movement continues freely
or meets with an impediment. When motion following muscular
contraction does not result in the sensation of motion in an
empty space, we have what is called the feeling of resistance,
that is, of muscular motion impeded. Whenever we have this
sensation we have also the sensation of contact with the body.
Since this association is inseparable, our sensations of touch
1. Ibid., P.270.
"be<em>come representative of the sensations of resistance with which they habitually co-exist." The constant co-existence of these two sensations erects the sensation of touch into a mark or sign of a Permanent Possibility of the sensation of resistance.

The Psychological Theory has more difficulty in accounting for the development of our idea of the primary quality of extension. Mill subscribes to Bain's theory, which recognizes two modes of discriminative sensibility in the muscular sense; the one corresponding to the degree of intensity of the muscular effort, the other corresponding to the duration of the same effort. From this second mode we derive our idea of extension. Differences in range of movement of members of the body can be sensed by the consequent differences in the duration of muscular effort. Different degrees of contraction in the same group of muscles enable us to compare differences in length, surface, situation and form. Length in space, not being in our consciousness originally, is constructed by the mind's laws out of the notion of length in time, as it results in different muscular sensations.

The participation of the eye, however, in generating the notion of extension alters its character greatly. Extension as brought to us by muscular sensations is generated by a succession of sensations. Yet the eye gives us a conception of extension which comprehends a great number of parts of extension simultaneously—and this is our ordinary conception
of space. Mill's explanation is that when the sensations of colour, by the principles of association, "become representative of the tactual and muscular sensations with which they are co-existent, the fact that we can receive a vast number of sensations of colour at the same instant (or what appears such to our consciousness) puts us in the same position as if we had been able to receive that number of tactual and muscular sensations in a single instant. The ideas of all the successive tactual and muscular feelings which accompany the passage of the hand over the whole of the coloured surface, are made to flash on the mind at once: and impressions which were successive in sensation become co-existent in thought. From that time...we think all the parts of extension as coexisting, and...believe that we perceive them as such." The tactual and muscular sensations, however, remain the basic and fundamental elements in giving us the idea of extension.

The idea of figure, form or shape is derived as a product of our more primitive sensibility to extension and range. Having once gained the ideas of distance and direction from our touch and muscle senses, we can arrive at the idea of situation and locality. From these constituents we form the idea of extension, if we think of the part of space involved; and of figure if we consider its boundaries, that is, its demarcation from other space.

1. Ibid., P.286.
There are few completely original points in Mill's epistemological theory. In his treatment of matter, he has simply developed Berkeley's argument; in his analysis of mind he has continued Hume's mode of thought; while his theory of causation and his recourse to the principles of association contain nothing which cannot be found in the earlier empirical philosophers. In each case, however, he has expelled from previous theories inessential and contradictory elements, and has set forth the core of the preceding doctrines in strong and decisive fashion. For example, he does not positively identify matter with sensations, as did Berkeley, but retains a different name for something which in our experience is plainly not identical with subjective sensations. This enables him to give a consistent and satisfactory explanation of our belief in the externality of matter, and consequently to avoid the solipsism into which Berkeley's theory inevitably falls. Again, in his use of such terms as "feeling", "sensation", and "idea" he is much more precise than was Berkeley. Further, his clear recognition of the part played by the existence of our fellow human beings in contributing to the notion of externality represents an important advance on the original statement of the idealistic position. And finally, when he comes to analyse the notion of the ego, he does not become so entangled as did Hume, whose recourse to memory as the explanation of the origin of our idea of identity was really a "petitio principii." Mill
shows plainly that the notion of identity is necessarily prior to any possibility of memory or expectation. He is then content to present the two alternatives: either, that if mind is a series of feelings, it is a series which by hypothesis is conscious of itself; or that we must ultimately recognize the importance of metaphysical inquiry to grasp the nature of mind. In short, Mill's epistemological system marks the highest point in the development of the empirical position before the advent of new techniques finally began to make the psychology on which empiricism was based capable of scientific investigation.
CHAPTER V.

BERTRAND RUSSELL: "OUR KNOWLEDGE OF THE EXTERNAL WORLD AS A FIELD FOR SCIENTIFIC METHOD IN PHILOSOPHY."

AND

"THE ANALYSIS OF MATTER."
After the work of the earlier English empiricists, the next great developments in philosophy came from the revolutionary changes in logic and science. For the abstruse theories of the dominant German school of philosophy scientists in the nineteenth century had little concern. But when the older theories of physics definitely began to break under the strain of new discoveries, scientists were forced to examine closely the epistemological assumptions on which they had been proceeding. In the analysis of such concepts as matter and causation, for example, they were driven to develop along new lines the ideas of Berkeley and Hume.

It is in this connection that we come to the work of the brilliant English philosopher, Bertrand Russell. Russell, who has pioneered in the fields of modern symbolic logic and of mathematical theory, has brought together the fields of philosophy and science by showing the possibility of applying logical analysis and scientific method in philosophy. He is by no means an empiricist "par excellence", as was John Stuart Mill, for in his stress on the importance of logic and mathematical theory in philosophy he follows in the rationalistic tradition of Leibniz; but he equally repudiates the contention that logic and mathematics alone can give us any information as to the real nature of our world. Russell exhibits them in their modern development as extremely powerful techniques for the interpretation and manipulation of
the data which must still be supplied by the empirical sciences. The particular problem with which he copes here is the question of the validity of the epistemological assumptions implied in the procedure of physical science, and the possibility of harmonizing the views of modern physics with the indubitable facts of immediate perception.

I. OUR KNOWLEDGE OF THE EXTERNAL WORLD.

By his own statement, Russell's answer to the constantly recurring problem of our knowledge of the external world, as given in the essay by this name, is not of a definite and dogmatic type, but amounts rather to an analysis and statement of the questions involved, as those questions are disentangled from each other by the logical-analytic method. Berkeley's attack, as reinforced by our knowledge of the physiology of the sense-organs, nerves and brain, is the standpoint from which Russell approaches the question of the reality of the external world. The general problem is:

from as slender a stock of initial assumptions as possible, to construct an account of the external world which shall place all the known facts and yet be able to meet Berkeley's attack.

The mass of common knowledge which affords the data for a philosophical analysis must in the main be accepted as true, since we possess no radically different kind of knowledge derived from other sources. Although these primary data can only be criticized by other data, we can nevertheless
distinguish various grades of certainty in the different kinds of common knowledge. These varying degrees of certainty attaching to different data are themselves part of our data. Further analysis of our common knowledge reveals that some of it is derivative—i.e., inferred from something else; and that some of it is primitive. We can also separate psychological from logical primitiveness—e.g., the inference we make from the expression on a man’s face to a corresponding emotional state in him is derivative psychologically but primitive logically, since our belief is not actually arrived at by a logical inference but by a psychological process of association of ideas.

The existence of these distinctions between primitiveness and derivativeness leads us to a further distinction between "hard" data—"those which resist the solvent influence of critical reflection"; and "soft" data—"those which, under the operation of this process, become to our minds more or less doubtful." Particular facts of sense and general truths of logic are perfectly hard data. Psychologically derivative but logically primitive beliefs—e.g., our belief in the permanence of the external world—are mainly to be classed as soft data.

To the facts of our own sense-data and the laws of logic we can add as other hard data some facts of memory; of introspection; and of comparison and of spatial and temporal relations within sense-data. Belief in the permanence of the
external world and of the existence of other minds, as soft
data, cannot form part of the slender stock from which our
reconstruction of the external world is to proceed. With
these distinctions in mind, the problem of our knowledge of
the external world now resolves itself into the question:
"can the existence of anything other than our own hard data
be inferred from the existence of those data?" Involved in
this question are two problems: (a) Can we know that objects
of sense, or very similar objects, exist at times when we
are not perceiving them? (b) If this cannot be known, can we
know that other objects, inferable from objects of sense but
not necessarily resembling them, exist either when we are
perceiving the objects of sense or at any other time? Russell
considers this latter problem of the "thing-in-itself" first.

Our passivity in sensation, which leads us to suppose
that sensations must have outside causes, is irrelevant; for
from this passivity we could argue only that our sensation
(a mental event consisting in our being aware of a sensible
object) might have a cause in the sensible object (that is,
in the particular patch of colour seen, or the particular
hardness felt.) There is no good reason at this point, then,
to concur in the common opinion that there is a thing-in-itself
which is the outside cause of the sensible object. Common
sense assumes the existence of permanent "things" with
changing appearances; but all that experience really gives
us is the correlation of certain bodily sensations with
certain others. The assumption that sensible objects persist
when not perceived "may be replaced by the statement that the effects of sensible objects persist, i.e., that what happens now can only be accounted for, in many cases, by taking account of what happened at an earlier time." As far as one man's experience is concerned, all the facts of common sense and of physics are explicable by some such means, since their "verification" consists merely in the occurrence of an expected sense-datum. (We must deal later with the question of the testimony of others, since this involves a knowledge of other minds, which are not given in sense.)

Although the theory of the thing-in-itself as ordinarily held cannot be supported, we must find a true interpretation of the basic assumption underlying it, since it is in outline the theory upon which physics and physiology are built. To do this requires a number of corrections in common thought. In the first place, we must realize that there are no such things as "illusions of sense." Objects of sense are always real: the illusory element is due to the inferences to which they give rise. If, on pressing the eyeball, we see two tables, then there are two visual tables. If touch tells us there is only one tactile table, "all we are warranted in saying is that, in this case, the manner of correlation of touch and sight is unusual." With this insistence on the indubitable momentary reality of objects of sense, Russell proceeds to frame a hypothesis which will not contain the objections to previous theories of our knowledge of the external world and which will be adequate to explain the facts. 1. Bertrand Russell, "Our Knowledge of the External World", P. 84 2. Ibid., P. 88.
Let us assume that each mind looks out upon the world from a point of view peculiar to itself. Every such point of view will be called a perspective. The system consisting of all views of the universe perceived and unperceived is the system of perspectives. A "private world" is a perceived perspective; but there may be any number of unperceived perspectives. In experience we find that two men may perceive perspectives so similar that they can use the same words to describe them: "they say they see the same table, because the differences between the two tables they see are slight and not practically important." If the similarity between two perspectives is very great, we say that the points of view of the two perspectives are near together in space. This space, however, is a relation between the two perspectives, and can be rendered continuous by hypothesizing a whole series of perspectives between any two similar perspectives, such that between any two members of this series, however similar, there are other perspectives still more similar.

The similarity of neighbouring perspectives enables us to correlate objects in one perspective with those in another. We can now define the momentary common-sense "thing". "Given an object in one perspective, form the system of all the objects correlated with it in all the perspectives; that system may be identified with the momentary common-sense 'thing'. Thus an aspect of a 'thing' is a member of the system of aspects which is the 'thing' at that moment."

1. Ibid., P.88.
2. Ibid., P.89.
Since there is only one space, in which the perspectives
themselves are elements, we must explain the correlation of
the private space of a single perspective with the one all-
embracing perspective space. Perspective space is the system
of the private spaces themselves, which are ordered by means
of their similarities. If we start from a private space
which contains the appearance of a circular disc,—e.g., such
as would be called a penny—we can form a whole series of
perspectives containing a graduated series of circular aspects
of varying sizes. Those perspectives in which the penny
looks circular will be said to lie on a straight line in
perspective space. They will be ordered on this line in
terms of the varying sizes of the circular aspects. The
perspectives in which the penny looks big will be considered
to be nearer the penny than those in which it looks small.

Now if we form another straight line of perspectives in which,
for example, the penny (seen end-on) looks like a straight
line of a certain thickness, we can say that the place
where these two straight lines meet is the place (in
perspective space) where the penny is.

We can now explain the correlation between a private
space and the parts of perspective space. "If there is an
aspect of a given thing in a certain private space, then we
correlate the place where this aspect is in the private space
with the place where the thing is in perspective space."  
"Here" is the place, in perspective space, which is occupied
by our private world. Finally, we may distinguish the two

1. Ibid., P.89.
places in perspective space which are associated with every aspect of a thing as the place at which, and that from which, the aspect appears. "The 'place at which' is the place of the thing to which the aspect belongs; the 'place from which' is the place of the perspective to which the aspect belongs."

Such a hypothetical picture of the world, since it fits the facts, since it is free from logical impossibilities, and since there is no empirical evidence against it, may be actual. The question of the reality of such a world brings us back to the question of testimony and the evidence for the existence of other minds.

No strictly logical refutation of solipsism is possible. All the experiences of our daily life may be phantasm of our own minds, since this view cannot be shown to be false. The minds of other people are among our original data, but the belief in them is a psychologically derivative belief. The well-known argument from analogy is inconclusive; because any scene in daily life might occur in a dream, in which case the inference from the appearances of the bodies of other people to their minds is generally held to be mistaken. The analogy in waking life is preferable to that in dreams only because of its greater extent and consistency. Yet the hypothesis that other people have minds "systematizes a vast body of facts...never leads to any consequences which there is reason to think false...enables us to extend our I. Ibid., P.92.
knowledge of the sensible world by testimony, and thus leads to the system of private worlds which we assumed in our hypothetical construction." Since nothing in experience contradicts its validity, we have good reason to accept it as a working hypothesis, and this acceptance permits us to enjoy that vast extension of our knowledge, beyond our own private data, which we find in science and in common sense.

II. THE WORLD OF PHYSICS AND THE WORLD OF SENSE.

Unless there were some wholly "a priori" principle by which unknown entities could be inferred from such as are known, the assumption of physicists that they are dealing with a "matter" beyond merely subjective sense-data can be justified only if matter can be exhibited as a logical construction from those sense-data. The epistemological structure of physics cannot be put on a sound basis unless there is some way to bridge the gulf between matter as it appears in physics and things as they appear in sensation. Despite the changes brought into recent physical theory by the principle of relativity, Russell considers that physics still deals with "a set of indestructible entities which may be called particles, moving relatively to each other in a single space and a single time." Over against this physical universe is the world of immediate data—the world of flux, of numerous private spaces, and of numerous private times.

1. Ibid., P.96.
2. Ibid., P.104.
In connecting the world of physics with the world of sense, we have three main problems: (1) the construction of permanent "things"; (2) the construction of a single space; and (3) the construction of a single time.

(1) The construction of permanent "things".

Historically, the assumption of indestructible "things" arose not from any necessary postulate of physics but from an instinctive belief in something permanent beneath all the changes of the sensible world. The problem at hand is to reconstruct the conception of matter without the aid of any "a priori" beliefs, for the empirical successes of that conception indicate that some similar assumption, properly interpreted, must be valid. In general, our task is to extrude from ordinary common-sense statements the notion of permanent "things" undergoing changes in time. All that experience really entitles us to assert is that certain series of very similar aspects vary according to certain laws. We shall define a "thing" as such a certain series of aspects. "To say that a certain aspect is an aspect of a certain thing will merely mean that it is one of those which, taken serially, are the thing."

If we search for principles by which to select certain data from the chaos of sensation, and call them all "appearances of the same thing" (interpreting this statement in the light of the foregoing remarks) we shall find that mere resemblance or continuity are insufficient criteria. From the procedure of physics, however, it is possible to find an

1.Ibid., P.107.
adequate definition of a "thing", for

"physics has found it empirically possible to collect sense-data into series, each series being regarded as belonging to one 'thing', and behaving, with regard to the laws of physics, in a way in which series not belonging to one thing would in general not behave. If it is to be unambiguous whether two appearances belong to the same thing or not, there must be only one way of grouping appearances so that the resulting things obey the laws of physics. We must include in our definition of a "thing" those of its aspects, if any, which are not observed. Thus we may lay down the following definition: 'Things are those series of aspects which obey the laws of physics.' That such series exist is an empirical fact, which constitutes the verifiability of physics."

Such a definition involves series of sense-data, but is not on that account too subjective for science. The point which is at issue here is that of the verifiability, not the objective truth, of physics; and verifiability is subjective to the degree that it depends upon our capacity for acquiring knowledge. Physics assumes unverifiable entities to simplify the statement of causal laws, but none of these entities forms an integral part of what is known to be true in physics. Such hypothetical entities can be exhibited as logical functions of sense-data. To achieve continuity we can postulate, for example, "ideal" appearances, "ideal" states of things, and "ideal" things. "It is unnecessary for the enunciation of the laws of physics to assign any reality to ideal elements: it is enough to accept them as logical constructions, provided we have means of knowing how to determine when they become actual."

Empirical knowledge is confined to what we actually observe;

1. Ibid., p.110.
2. Ibid., p.112.
and what we actually observe are appearances of sense.

(2) The construction of a single space.

The one all-embracing space of our experience, "though convenient as a way of speaking, need not be supposed really to exist." Different senses have different spaces. All that experience asserts is that these separate spaces can be correlated by empirically discovered laws. "The one space may turn out to be valid as a logical construction, compounded of the several spaces, but there is no good reason to assume its independent metaphysical reality." Further, the spaces of immediate experience, in which no points are given, differ from that of geometry and physics, which postulate an infinite number of points. Since the required points are not given in experience we can get from experience over to the points of geometry only by means of some logical construction from immediately given objects.

Experience never provides us with infinitesimal sense-data, but under the influence of attention we can split up what formerly appeared as an undivided whole into parts contained within that whole. "This relation of enclosure, by the help of some very natural hypotheses, will enable us to define a 'point' as a certain class of spatial objects, namely, all those... which would naturally be said to contain the point." Such "points" will not be the points of ordinary

1. Ibid., P.113.

2. In "The Analysis of Matter" Russell holds that as a piece of logic, this method of reaching points from enclosure-series is faultless: "but as a method which aims at starting with the actual constituents of the world it seems to me to have certain defects." (i.e., the question of minima and maxima)(P.292) Russell is consequently "unable to accept Dr.
thought, but they will have all the properties requisite for geometry.

(3) The construction of a single time.

Since events of which we are conscious "do not last merely for a mathematical instant, but always for some finite time, however short, "instants are not among the data of our experience. If, then we are to get from our experience over to a time which will have the properties requisite for physics, we shall have to resort once more to some construction from the time relations given in experience.

All that experience provides in this case is a knowledge of events, ordered by the relations of simultaneity and succession. And yet, "in order to assign a date exactly, we must be able, theoretically, to determine whether any given event is before, at, or after this date, and we must know that any other date is either before or after this date, but not simultaneous with it." By the method of "partial overlapping" of events a completely accurate definition of the time of an event can be found:

"Let us take a group of events of which any two overlap, so that there is some time, however short, when they all exist. If there is any other event which is simultaneous with all of these, let us add it to the group; let us go on until we have constructed a group such that no event outside of the group is simultaneous with all of them, but all the events inside the group are simultaneous with each other."

Whitehead's construction of points by means of enclosure-series as an adequate solution of the problem which it is designed to solve." (P.294.)

1. Ibid., P.117.
2. Ibid., P.118.
This whole group, which is defined as an instant of time, can be shown to have the properties we expect of instants: i.e., (1) the instants as defined form a series; (2) given any event, we can find at least one class, such as we used in defining instants, of which it is a member; and (3) such a series of instants is compact—i.e., "given any two events of which one wholly precedes the other, there are events wholly after the one and simultaneous with something wholly before the other." The above definition of instants, then, is adequate for mathematics, and does not assume any disputable metaphysical entity.

Such exemplary methods of defining matter, space and time as the foregoing show that it is possible, by means of purely logical constructions, to make a world with the kind of properties given in the world of sense "amenable to mathematical treatment by defining series of classes of sense-data which can be called respectively particles, points and instants. If such constructions are possible then mathematical physics is applicable to the real world, in spite of the fact that its particles, points and instants are not to be found among actually existing entities." By such means, then, we can justify the epistemological procedure of physics.

1. Ibid., P.120.
2. Ibid., P.122.
III. THE EVIDENCE FOR THE TRUTH OF PHYSICS AS A MEANS OF KNOWLEDGE OF THE EXTERNAL WORLD.

The question of the evidence for the truth of physics, i.e., of the relation of physics to perception, is the topic of Part II of Russell's "The Analysis of Matter." Common sense holds that perception reveals external objects to us directly. Science, which holds that there is a chain of events between the external object and our perception of it, requires, for various reasons, a justification for its assumption of the existence of the external object. "The evidence for the truth of physics is that perceptions occur as the laws of physics would lead us to expect—e.g., we see an eclipse when the astronomers say there will be an eclipse. But physics itself never says anything about perceptions; it does not say that we shall see an eclipse, but says something about the sun and moon." From common sense science takes over, among other inferences, this important inference from perception to unperceived entities. Common sense makes this inference in the form of a belief in the permanence of perceived objects at times when they are not perceived. Such a belief is "a piece of audacious metaphysical theorizing" which arises in its most primitive form as a physiological rather than a logical inference. Yet, since this belief persists in advanced scientific or philosophical theory "the inquiry into its justification is the central problem

in the analysis of matter, philosophically considered." 1 

This conception of an external matter as the cause of our perceptions must be examined closely, since, if perceptions have no external causes, epistemologically, physics might be expected to collapse. Accordingly the question of the evidence for the truth of physics rests fundamentally on the validity of the causal theory of perception. The examination of this theory and its alternatives forms the core of Russell's investigation of the relation of physics to perception.

(1) The causal theory of perception.

The common-sense theory of perception becomes involved in contradictions so manifest and well-known that we can by no means agree with its assumptions.

When we come to examine the causal theory of perception we cannot expect to find a logical demonstration of its assertions: Berkeley's arguments have largely ended that hope. Fundamentally, says Russell, our main ground for inferring that our percepts and our recollections do not constitute the entire universe is our desire to believe in simple causal laws. The argument for other people's percepts, which is presupposed in the acceptance of testimony, comes first in logical order when we are trying to establish the existence of things other than our own percepts. In this

1. Ibid., P.192.
argument there are three stages. The first stage consists in the organization of our own percepts into groups. We have already seen that it is possible to eliminate reference to an object and speak of a "physical object" as a group of percepts. In the second stage, we observe that "the behaviour of the percepts we call other people's bodies is similar to that of our own body in response to this or that stimulus." In this stage we experience the stimulus and make the same response as the others do. But there are many instances of a third stage in which we do not experience the stimulus but suppose, from their behaviour, that other people have experienced it: "This is a particularly plausible supposition if we ourselves experience the stimulus in question very shortly after we have observed the behaviour which led us to infer it. The third stage is the more important, since in the second we might attribute the behaviour of others to the stimulus which we perceive, and thus escape inferring unperceived existents, while in the third stage this alternative is not open to us."

The belief that others perceive what we do not is not demonstrative—but it is as well-founded in reason as our belief that we could have a perception of touch if we stretched out our hand to an object in visual perception. Such a belief involves induction, but if induction is valid at all we may take as reasonably certain the proposition that there are existents which we do not perceive.

1. Ibid., P.204.
2. Ibid., P.205.
If we once admit into our argument the percepts of other people, the similarities between their percepts lead us to accept the theory of a common origin for similar and simultaneous perceptions. It is true that in inferring such an origin we are inferring something which can never be experienced, but the common-sense arguments for an external cause of perceptions are strong. Phenomenalism, for example, would say that, except where there are percipients, space is purely "ideal". But the interval between the report of a gun fired at A and the auditory perception of the report at B and C is a function of the distances AB and AC. It is difficult, therefore, to consider space as being "purely ideal" where there are no percipients, when space has such an actual influence on perceptions. Or again, if we were to place a dictaphone and a hidden man in a room to record the conversation taking place—if the report of the man agrees with the record of the dictaphone "we must suppose some causal connection, since otherwise the coincidence is in the highest degree improbable."

By resorting to certain "ideal" constructions, however, the phenomenalist can preserve the whole of physics—at least formally—and he can preserve it with the bare minimum of hypothesis. But

"the great difficulty in the above theory of 'ideal' elements is that it is hard to see how anything merely imaginary can be essential to the statement of a causal law. We have to explain the dictaphone which repeats the conversation. We will suppose that it was seen in place before and after the conversation,
but not during it. Consequently, on the view we are examining, it did not exist at all during the conversation. Causal laws, stated without fictitious elements, will thus involve action at a distance in time and space. Moreover, our percepts are not sufficient to determine the course of nature: we derive causal laws from close observation, and preserve them in other cases by inventing 'ideal' things. This would not be necessary if percepts sufficed for the causal determination of future percepts. Thus the view we are examining is incompatible with physical determinism, in fact though not in form. We could multiply difficulties of this kind indefinitely."

Although it is logically possible to interpret the physical world in terms of ideal elements, such an interpretation is, in Russell's view, unplausible and has no positive grounds in its favour. The only remaining alternative to the causal theory of perception is solipsism, which is "the view that from the events which I experience there is no valid method of inferring the character, or even the existence of events which I do not experience." The escape from solipsism is admittedly pragmatic, not strictly logical; for our escape involves induction and causality, which are still subject to the doubts raised by Hume. The assumption, however, that our percepts have external causes which may exist apart from our perceptions is the preferable one to make. The essential assumption for this causal theory is that a group of percepts formed by ordering the percepts of various observers about a centre "can be enlarged by the addition of other events, ranged in the same space about the same centre, and connected both with each other and with the

1. Ibid., P.214.
2. Ibid., P.298.
group of percepts by laws which include the laws of perspective. The essential points are (1) the arrangement about a centre, (2) the continuity between percepts and correlated events in other parts of the space derived from percepts and locomotion. The first is a matter of observation; the second is a hypothesis designed to secure simplicity and continuity in the laws of correlation suggested by the grouping of percepts."

(2) The nature of scientific knowledge.

The scope of scientific knowledge where we are making inferences from percepts to unperceived events is confined to structure only. We do not need to think of any absolutely unknowable "Ding-an-sich", for we assume that differences in percepts imply differences in stimuli. The intrinsic characters of stimuli will be unknown, but we can secure a great deal of knowledge as to their structure. The formal assumption that there is a one-one relation between stimulus and percept "enables us to infer certain mathematical properties of the stimulus when we know the percept, and conversely enables us to infer the percept when we know these mathematical properties of the stimulus." We invert the maxim "same cause, same effect" into the form "different causes, different effects." For example, when we see red and green together, we infer a difference in structure between the stimulus corresponding to the red percept and that corresponding to the green.

1. Ibid., P.217.
2. Ibid., P.227.
The conception of substance in physics has been largely dispensed with, along the lines suggested earlier. A piece of matter is a connected string of events, and the string of events constituting one material unit is distinguished from others by the existence of an intrinsic causal law. "The physical object to be inferred from perception is a group of events, rather than a single 'thing'". Common sense has no justification for referring percepts, which are always events, to "things" with changing states. The interpretation of physics which dispenses with permanent substance is therefore preferable and has been shown to be perfectly possible.

From the standpoint of physics, a percept can be considered as a term in a physical process, characterized by the fact that it has traversed a particular region and has undergone corresponding modifications--e.g., in the case of a visual percept, this region is the eyes, the optic nerve, and part of the brain. The "prima facie" difference between a percept and a physical process can quite readily be explained away, for the apparent gulf (e.g.) between a light-wave and a visual percept is due to comparison of events of different orders. A light-wave is much more complex in reality than in mathematics: we treat in physics the whole group of correlated events as if it were one event, i.e., as a light-wave.

"There is no theoretical reason why a light-wave should 1. Ibid., P.247.
not consist of groups of occurrences, each containing a member more or less analogous to a minute part of a visual percept. We cannot perceive a light-wave, since the interposition of an eye and brain stops it. We know, therefore, only its abstract mathematical properties. Such properties may belong to groups composed of any kind of material. To assert that the material must be very different from percepts is to assume that we know a great deal more than we do in fact know of the intrinsic character of physical events."

Nothing that physics tells us can disprove the supposition of a qualitative continuity throughout a physical process whose last term is a percept. The realization of this fact removes the mystery which was formerly a great obstacle to the acceptance of the causal theory of perception.

The general outcome of Russell's discussion has been to justify the ordinary scientific attitude towards the external world. Physicists can legitimately infer that our percepts have external causes. The epistemological assumptions of physics can be defended, because it is possible by means of purely logical manipulation to construct from sense-data particles, points and instants with properties adequate for physics. But physical knowledge is purely mathematical and structural, and is therefore extremely abstract. Since physics leaves open all kinds of possibilities as to the intrinsic character of the world to which its equations apply, "the only legitimate attitude about the physical world seems to be one of complete agnosticism as regards all but its mathematical properties."

1. Ibid., P.263.

2. Ibid., P.271.
CHAPTER VI.

MORITZ SCHLICK: "ALLGEMEINE ERKENNTNISLEHRE."
MORITZ SCHLICK: "ALLGEMEINE ERKENNTNISLEHRE."

The work of the contemporary philosopher Moritz Schlick is representative of the modern movement known by the name of "logical positivism". This stream of thought, which continues in the empirical tradition of David Hume, marks a complete break with the abstruse idealistic and metaphysical systems characteristic of much of the philosophy of the last century. For Schlick, the bounds of knowledge do not fall outside the sphere of ordinary experience and of the sciences in general. The goal of knowledge is not a mystical one: we are not concerned to become acquainted with objects after the manner of intuitive experience, but rather to discover the relations obtaining between those objects. The process of knowledge, which essentially involves the search for identity amidst diversity, is carried on by the ordering of symbols to features in the objective world. The selection and disposition of the first symbols in a scientific structure is a relatively arbitrary procedure, but the discovery of the relations which exist between the objects or states of affairs designated by those symbols must wait on experience. We are led to a correspondence theory of truth: a true judgment is one which clearly and unequivocally designates a state of affairs. When consistently developed, this conception of knowledge as a system of symbolic designation gives promise of solving a number of vexatious problems, and even indicates the possibility of extending the quantitative methods of the exact sciences into the sphere of
psychical processes. The resulting monism of epistemological method enables us to put an end to the troublesome dualism which has dogged the footsteps of modern philosophy since the time of Galileo and Descartes.

I. THE NATURE OF KNOWLEDGE.

To give an exposition of the structure, extent and validity of knowledge without first making some provisional assumption as to its nature is a procedure which is as unfruitful of good results in philosophy as it is in science.

The simplest possible examples from ordinary life and from science enable us to make this necessary assumption. We can define knowledge as the recognition in a new situation of something already known. In a certain collection of qualities, for example, I recognize the collection to which I formerly gave the name "tree". In science, when we say that "Light is a form of wave motion" we merely indicate the fact that in the characteristics of light phenomena we recognize the same properties which have always appeared in the propagation of waves. The experiments of Hertz and others enable us to carry this recognition even further. On the basis of the fact that light waves have certain properties in common with electrical waves we can say that "Light is an electromagnetic phenomenon."
The fact that we can discover elements already known in new relations means that the essential demand of knowledge is for the reduction of two previously separated phenomena to an identity. As knowledge advances it is clear that the number of phenomena which can be explained by one principle will grow greater: for example, modern physics has brought together field of research which were formerly separated. Yet we can never explain all phenomena by one principle only, as many philosophers have tried to do, for such a general principle because of its extreme extension could not enable us to distinguish and classify individual phenomena and would therefore gain for us no real knowledge. On the other hand, the mere distinction and nomination of every particular phenomenon would indicate acquaintance with, but not knowledge of, those phenomena. Genuine knowledge, which consists in the reduction of phenomena into systems by the help of certain principles, must fulfil two conditions: it must (1) achieve complete determination of the individual phenomenon and (2) achieve such determination by the help of the most universal concepts.

"All knowledge is a recognition or a rediscovery. And rediscovery means an equating of that which is known with that as which it is known." In ordinary life this act of equating takes place by means of the comparison of perceptions.

Experience assures us that recognition and knowledge by means of perceptions has sufficient accuracy for everyday purposes, but our perceptions are too vague, transient and unreliable for science. Further, one of the conditions of scientific knowledge is that we proceed on general principles, since otherwise any organization of particular facts is impossible. But Berkeley clearly demonstrated the impossibility of reaching a true universal by means of the combination of mere perceptions, which are always particular. To escape from the vagueness and uncertainty attendant upon perceptions science, which demands exact identification, has recourse to concepts.

The content and constancy of a concept can be completely determined by definition. A concept is merely a construction of thought and has only the role of a sign or symbol for the objects it designates. Since a concept is not a real object it must be denoted in actual thinking by means of perceptual processes, but in spite of the vagueness to which these last are subject such a perceptualization does not destroy the value of a concept provided we realize that the function of the perception is simply to represent the corresponding concept. The epistemological significance of the concept consists entirely in the fact that it has a denotative or designative function. For Schlick, "designation" ("bezeichnen") involves a correspondence or an ordering. To say that certain objects fall under a certain concept means that they are ordered to this concept. Beyond this designative function
concepts have no real being whatever, so that we need not be led into the "Scheinprobleme" which arise from Platonic systems.

Yet in resorting to concepts as a means of exact designation we have only postponed the difficulty which led us to abandon perception as being insufficient for scientific thinking, for science eventually comes back to perceptual observation. It is possible so to choose the defining properties of an element, for example, that this objection need not constitute a practical hindrance to science, but the problem still remains for epistemology. Apparently the contents into which the definition of any real object resolves the concept are in the last analysis always of perceptual nature. This mode of definition, of course, brings us back to certain factors of experience which are ultimately indefinable.

Mathematics, however, has found a way out of this predicament. Realizing the unsatisfactoriness of basing the most elementary geometrical concepts on direct perception or intuition, mathematicians have developed the system of "implicit definition", or definition by postulate. In such a system terms such as "point", "straight line", "plane" etc., have, to begin with, no meaning or content whatever. They receive meaning only through the system of axioms, which lay down in strict form the relations of the basic concepts to each other. By this method of definition mathematics can be removed from an empirical basis and can be given a
completely secure foundation. A strictly deductive mathematical system is independent of perception. Perceptual constructions are significant simply as illustrative examples of the mathematical concepts. The building of such a system is a mere play with symbols, and its strictness is no longer assured when it is applied to perceptual situations; but nevertheless the general principle of implicit definition, by freeing us from the necessity of referring concepts to perception, enables us to give them exact determination.

A concept is simply a sign made to correspond to objects. A judgment, in which two or more concepts are united, is also a sign, but it designates a fact—i.e., it asserts that certain relations exist between objects, either real or conceptual. A fact involves at least two objects and a relation obtaining between them. When a judgment serves as a new sign of a previously undesignated state of affairs, it is a definition. A judgment unites concepts, but at the same time concepts unite judgments by virtue of the entrance of the same concept into different judgments. This fact assures the possibility of concepts and judgments being united in a coherent structure, which is an essential condition of knowledge.

In the process of knowledge the "predicate concept is built up by the intersection ("Kreuzung") of a number of general concepts. " The subject is subsumed by judgment under each of these and is thus determined as that which is designated by all of them and which participates in all of
them at the same time.¹ It is in this manner that general concepts can designate a particular object. "By the intersection of general concepts an area is marked off in their centre, in which nothing but that object can be placed."¹ For example, only a few general concepts such as "wave motion" and "cause of visual sensation" are sufficient to designate the process called light. In the exact sciences the precise demarcation of this conceptual place to which the object belongs is brought about chiefly with the aid of quantitative determinations.

For a theory which considers that thinking is a system whereby we merely order symbols to the objects with which we have to deal, truth will lie in the adequate and unequivocal designation by a judgment of a state of affairs. A false judgment is one which fails to secure this unequivocal representation of the facts in a situation. A negative judgment is merely a convenient practical device for indicating that the corresponding positive judgment is false, and finds no place in a completed system.

We can know which fact a given judgment designates only by virtue of the place which a proposition occupies in a system of judgments. No direct "evidence" can ever assure us of the truth (i.e., the unambiguous reference) of a judgment. It is perfectly "evident" that the sun goes round the earth, but our system of knowledge tells us that such a statement is false. Truth is not an immanent property of a judgment, because the whole being of a judgment consists in

¹ Ibid., P. 54.
its relation to a given state of affairs.

By a suitable choice of objects "it is possible to frame implicit definitions of such a sort that concepts defined by them will secure clear designation of those real objects." "These concepts hang together in a system of judgments that completely agrees with the net of judgments, which, on the basis of experience, was constructed to correspond adequately to the system of facts." In other words, it is possible to construct a purely logical system whose propositions can adequately designate real states of affairs. When so applied to reality, however, a deductive system loses its strict validity: for "every proposition about real facts...has the character of an hypothesis."

There are only two classes of judgments, and between these two types there is a sharp division: (1) the propositions of logic and mathematics, and (2) the synthetic "a posteriori" propositions of science or of experience in general. Mathematical or logical systems are purely deductive, tautological and apodictic. Real knowledge is synthetic and is always "a posteriori".

Knowledge is not found simply in immediate experience. Intuition gives us mere acquaintances with objects, not knowledge of them: it is "blosses Erleben." To know objects means "to find one in another"--to find identity amidst diversity. We secure knowledge by ordering symbols to objects and by discovering from experience the relations 1. Ibid., P.65.
obtaining between those objects. Judgments, or complex symbols which assert relations between objects, are true when they unequivocally represent the corresponding state of affairs. A science consists in a coherent structure of such judgments.

II. THE NATURE OF THE REAL: THE "THING-IN-ITSELF" OF SCIENCE.

All our judgments, unless they are purely analytical and tautological, claim to give us knowledge about "reality". In Schlick's view, the discovery of an adequate criterion of reality is a necessary condition for the clarification of the state of our knowledge concerning the external world.

We are not entitled to frame concepts of reality which are out of all relation with the meaning that concept has in ordinary life and in science. In everyday experience, the real is always that which is directly given. But common sense believes as well that the real may not always be given—mountains and rivers continue to have real existence even when they are not perceived, because they continue to have effects which are perceivable. This belief is taken over in philosophy in the definition that everything which is real is a cause: "wirklich ist, was wirkt." Yet the fact that existence is separable from activity, and the fact that Being cannot be sufficiently characterised by the existence of mere relations (such as the causal relation) render this criterion unsatisfactory. Kant's definition of the real as "that which is bound up with the material conditions of experience" gives us the answer: reality must be determined
in time. Everything which really exists, exists for us at a definite time. Such a criterion includes as well the original common sense definition of reality as that which is directly given, for the existence of an object at a particular time means simply that it is set in a particular relation to the "now" of immediate experience. Orientation in time is the criterion of reality.

We can now proceed to the realistic thesis which is central in Schlick's epistemology, namely, that strict positivism or what he calls a "philosophy of immanence" is insufficient for science. In dealing with the real we must employ conceptions which transcend what is actually given in experience. We must, among other things, postulate the existence of "things-in-themselves". When we affirm the reality of an object (or process, or state of affairs) which is not directly given to us in sense, (i.e., when we are forced to fix it in time) we call that object a "thing-in-itself." When we say that an object exists "for itself" we simply mean that it exists even when we do not perceive it.

The "Immanenzphilosophie" or strict positivism of epistemologists such as Mach and Avenarius was an attempt to create a theory which should not be troubled with the difficulties attendant upon the historical thing-in-itself of Kant and others. In Mach's view, the world can be conceived simply as a coherent structure of colours, tones, smells,
tastes etc. These "elements" are always bound together in changing but relatively constant structures. Bodies do not produce sensations: complexes of sensations form bodies. The task of science is to describe in the simplest possible way the dependence of these elements on one another. What are the objections to this Berkeleyan interpretation of science?

The "immanence philosopher" must hold that the objects which are not given in experience and yet about which science makes judgments—e.g., the other side of the moon—are either real or unreal. In the latter case the concepts ordered to such objects are mere "Hilfsbegriffe" or auxiliary concepts. An object $O$ is constituted by all its aspects or "element complexes" $A_1 A_2 A_3$ etc. To ensure continuity of the "thing" when it is not perceived we must postulate "ideal" aspects, and if we are taking the first position we hold that those aspects, though not perceived, are nevertheless in existence. Schlick considers that this theory gives no adequate account of the fundamental distinction between perceived and unperceived aspects, and that it could not do so without assuming a subject, object and a relation between them. Such transcendent assumptions are impossible in a purely immanent theory. In the second place, this conception of an object as being constituted by all the possible aspects or "element complexes" which could exist for any being at any time fails to obey the principle of parsimony, because of the complexity of such an endless number of possible aspects.
It is simpler to postulate a thing-in-itself which is a complex of objectively existing processes or states. The complex of processes which form such a thing are not to be considered as only slightly different from the "element complexes" of Mach's theory, because these complexes of various sense perceptions are given in direct experience and are completely subjective. The immanence theory springs in part from the desire to dispense with realities which are not directly known. Yet the demand to know objects directly ("kennen") is not a condition of true knowledge; and in any case the hypothetically postulated "ideal" aspects can never be directly given, so that the theory fails to achieve its purpose.

Further, how do we know which "elements" form the real object? Mach has attempted to make the orderliness of the structure of these "element-complexes" ("die Gesetzmässigkeit ihres Zusammenhanges") the constant which unifies his "elements" into one object. But this orderliness of appearances cannot be equated with the real nature of an object. Such a procedure would erect a mere concept into a dynamic power:

"To say that a thing in the external world is a complex of elements obeying laws, and to say that it exists even if the elements themselves are not given; and to believe that we have thereby attributed the same reality to things as a sense-datum possesses, is to reify a law; and the resulting conceptual picture is identical with the concept of force as it held sway in a phase of science which has now passed away. The law-abidingness of the coherent structure of elements has become a power which simply creates certain elements as soon as certain conditions are given."

1. Ibid., P.197.
The second possibility— that unperceived objects are unreal—is still open to us. The positivist must maintain that only the actually given is real. All else is mere "Hilfsbegriff." To say that "A body exists when not perceived" must be interpreted as a symbol for the prediction that the "elements" will again appear under certain conditions. Esse will always be percipi. In the system of Avenarius, everything which exists is a member of a "principal coordination", of which the subject (as ordinarily conceived) is the "central member" ("Zentralglied") and the object is the "opposite member." ("Gegenglied.") In such a system there would be no place for any thing-in-itself, for everything real must be a member of this coordination.

This view irreconcilably contradicts causality, for the causal principle demands a continuum of the real. If we confine ourselves only to given existents we cannot establish firm rules of causal succession. The causal series on which all science rests can be made continuous only by the filling-in of existents which are not given. Since the causal relation only exists between realities, these postulated existents must be considered as real—in which case the "immanence philosopher" must recognize a transcendent reality—or the causal relation must be dismissed altogether. The denial of this relation, which is the fundamental assumption of all science, merely to uphold the principle "esse is percipi" would be the act of "a blind and completely useless
dogmatism." We have already seen that Russell pointed out the weakness in phenomenalism (which seems to approximate Schlick's "Immanenzphilosophie") by showing that it was "incompatible with physical determinism, in fact though not in form."

A strictly positivistic view cannot give a satisfactory account even of objects which are perceived by several individuals at the same time. Avenarius states that when two people say they perceive the same object there is a common "opposite member" in two "principal coordinations". Yet physics and psychology inform us that no two people ever have similar experiences—and even if their experiences were completely similar they would not be identical. No one "element" ever occurs in two "principal coordinations" of which the "central members" are different: the reality which is given to one individual is never given to another. We are led to a system like that of the "Monadology." Every "principal coordination" is a Leibnizian monad—and "the monads have no windows." The world falls into as many pieces as there are "central members", and only a metaphysical system such as the pre-established harmony can put it together again. Yet the sole aim of the immanence theory was to avoid metaphysics and to confine itself to the immediately given.

We must therefore consider the concepts without which we cannot describe the orderly change of perceptions not as mere "Hilfsbegriffe" but as signs for realities which are
not directly given. And our criterion of reality enables us
to separate mere fictions from symbols which designate
something real. If the object designated must be assigned
to a definite time, it is real. Such a "transcendent"
assumption is no more objectionable than is the assumption of
the immanence theory itself when it places the past in the
realm of the real,—for the past is not given and cannot be
given again. We assume it because we have no ground to
deny it, and because we need it to make the present compre­
hensible. The thing-in-itself which we assume for similar
reasons is not directly known ("bekannt") but the demand that
we should have such direct acquaintance with objects
expresses a view which belongs to a mystical conception of
knowledge. Our thing-in-itself is not a permanent "substance",
but simply a connected complex of objective processes or
events.

The space, time and sense qualities of perception cannot
possibly be considered to be "objective"—i.e., the things-in-
themselves which are the objects of physics are not in
perceptual space and time. But on the theory of knowledge
here outlined the subjectivity of our perceptual processes
gives no basis whatever for scepticism. On the contrary, if
knowledge consists in the discovery of relations, the thing-
in-itself is completely knowable. It is a fact of experience
that we can find a structure in the representation of the
thing-in-itself as it appears in perception. The manner and
means of representation is a subject for psychology;
for epistemology it is sufficient that it is represented. Now the structure of the "phenomenon", to use Kant's term, must either be the work of our own minds, which is the idealistic theory of Fichte; or the features in that structure must correspond point for point to features in the thing-in-itself. Since Fichte's solipsism makes any scientific knowledge impossible we must assume that in knowing the structure of the phenomenon we know the structure of the corresponding noumenon as well, and to as great a degree. On this structural theory of knowledge, therefore, the distinction between different grades of reality or between "appearance" and "reality" has no place or meaning. Things-in-themselves are not temporal or spatial in the same sense as things in the given world are, but the spatial and temporal relations given in perception can be precisely ordered to corresponding relations in the things-in-themselves.

III. THE NATURE AND EXTENT OF SCIENTIFIC KNOWLEDGE.

Knowledge as a system of ordering symbols to facts finds its most precise expression in the quantitative methods of the exact sciences.

The objects of physics, for example, are not given in direct spatial and temporal perception, since our perceptual spaces and time are subjective. We can designate objects only by making use of the relations by which they are defined for us. When we look at a yellow pencil we can not localize the color itself at the physical or "transcendent" (i.e., objective or real) place at which the objective pencil is located. The
objectively existing pencil cannot be subsumed under the concept "yellow",--and yet we need some concept in order to develop an unambiguous reference. We might postulate some unknown quality in the objective pencil to which the perceptual yellow would correspond. But if we proceeded in such a manner we would have to postulate a quality corresponding to every possible shade of yellow. Every shade would be "unknown" in our sense, for it could not be brought into relations with other shades or reduced to them.

Physics, however, escapes successfully from this unsatisfactory stage by ordering quantitative concepts to qualitative perceptions. Instead of unknown qualities, in this case it introduces the concept of varying frequencies of objective light waves. We can trace a similar process in the development of the physical theory of heat. On the qualitative level we are dealing only with subjective sensations, but by various devices we subject heat to mathematical treatment in terms of the mechanical concepts of mass, space and time.

This procedure is characteristic wherever exact knowledge is gained. "Qualities are only completely known, i.e., completely and unequivocally designated by the combination of already existing concepts, when we succeed in reducing them quantitatively to one another." ¹ "The possibility of quantitative determination is the universal and necessary condition of final knowledge...The procedure of the elimination of all qualities is the core of all advances in

¹ Ibid., P.258.
knowledge in the descriptive sciences." Yet science does not ignore qualities. It merely uses corresponding quantitative differences as a means of designation of them. Science cannot regard nature as a play of mere quantities, for quantity is an abstraction which presupposes a real existent:

"It is an unpermissible metaphysical interpretation of the scientific picture of the world, to say that in the external world no other qualities objectively exist except the final 'intensities' whose quantitative transformations form the foundation-stones of the universe of physics."

We must regard the external world as a manifold of infinitely varying qualities, so mutually interwoven and interdependent that they can be designated or described by the quantitative systems of the natural sciences. These conceptual systems enable us to deal with the orderly changes in the qualities of the external world. This orderliness can be expressed by the fact that to every one of the qualities in the external world a concept can be ordered which is formed from the combination of concepts of other qualities.

We can give a clear definition of what we mean by "knowledge of the external world."

"To discover that orderliness means 'to know the external world,' for by that discovery the most general is rediscovered in the particular, and the latter is thereby known." 2

The objects of the external world—the things-in-themselves—are conceived in this way as orderly structures of qualities:

1. Ibid., P.258.
2. Ibid., P.260.
"An atom, an electron, is to be conceived as a union of qualities which are connected with each other by definite laws—not as a substantial thing, which would support its qualities as attributes and which would be distinct from them as their substratum ... In the last analysis, all our knowledge reduces to relations and dependences, not to things or substances."

Ever since Descartes' sharp separation of "res extensa" from "res cogitans" epistemology has had on its hands the problem of the relation between the two. Schlick asserts that a proper conception of knowledge enables us to recognize this problem as an illusory one. The real point of dispute is: Where are our percepts located? Where is consciousness?

The psychologist, no matter at what place he locates a sense quality, e.g., the whiteness of a piece of paper, finds that place already occupied by the physicist's system, in which there is no place for any such quality as whiteness. But the quarrel over the location of conscious processes arises from the confusion of two different kinds of space. The space (or rather spaces) of the psychologist are perceptual and are therefore the product of conscious experience. Perceptual space is already "in" consciousness, so that it is meaningless to ask where (in perceptual space) consciousness is. The objective thing-in-itself of the physicist, on the other hand, is not in perceptual space at all: for him "place" is a purely abstract conception. The trouble comes from the erroneous assumption that physical objects are always extended. Yet strictly conceived

1. Ibid., P.260.
2. Ibid., P.261
"physical" denotes "reality insofar as it is designated by the spatio-temporal, quantitative, conceptual system of the natural sciences." "Physical" does not denote a particular kind of reality, but a particular mode of describing reality.

A proper conception of physical knowledge enables us now to put our knowledge of conscious processes on a quantitative basis. Introspectionism and Fechnerian psychophysics cannot achieve any real knowledge, but physiological methods can. It is a plain fact of experience that psychical processes are very intimately connected with that part of the physical world which is represented to us in perception as the brain. Physiological processes can theoretically be used to designate psychical realities. The mistake most commonly made is the confusion of the physiological processes, which are merely abstract and conceptual, with the perceptions that we have when, for example, we dissect the brain. Our perceptions are merely sensuous representations of those real physical processes and if we confuse the two we have all the old difficulties on our hands again.

Schlick's thesis can be illustrated by a simple example. Suppose we have an individual A looking at a red flower, and a second individual B observing A's brain processes. (We assume a high technical development of physiology.) The realities and concepts in this situation are as follows:

(1) the thing-in-itself—the flower, with which we are not directly acquainted but which is described by botanical and 1. Ibid., P.269.
physical concepts.

(2) the direct experience of A, designated by the direct psychological concept "experience of red." This same experience can also be designated by physical concepts—i.e., B finds that the same existent called by A "red" can also be designated by the physical concept "process in A's brain."

(3) the visual experiences of B, consisting of certain colours, forms, etc. B will probably describe the parts of this experienced reality with psychological names: he will speak of gray shapes and round figures, but he can apply physical concepts to them also. He could speak of them as "processes in the complexes of molecules which form the thing called 'my brain'."

As far as A is concerned there is only one reality, namely, the direct and immediate awareness. This reality can be designated by two different conceptual systems: (1) by the psychological system of concepts ("experience of red") or (2) by the physical system of concepts ("process in A's brain")

The second mode of designation of the reality in this situation, because it is physical, lends itself to quantitative determination and so to exact knowledge.

If Schlick is right in his assertion that the physical mode of description can be applied to all parts of reality, then the problem of the knowledge of the external world "per se" is largely removed. We have already observed that his theory of the nature of knowledge makes the scepticism based
on the subjectivity of perceptual processes completely irrelevant. But further than this, no essential mode of distinction between the qualities of the world can be assumed. "The separation between given and not given, subjective and objective qualities is of a contingent and factual nature." It is not legitimate to erect on this fact a "Psychomonismus", for the monism Schlick is advocating is an epistemological monism, i.e., the view that the quantitative method of physics can be universally applied as a tool of thought to all reality. There is, of course, a certain final contrast between conscious processes and the external world, but the recognition of this contrast cannot lead us to a dualism, but rather only to the distinction and separation of the coherent system of conscious processes ("Bewusstseinszusammenhang") from the mass of other coherent systems. The fact that the universe is a texture of infinitely numerous qualities enables us to adopt as well a pluralistic view. We have a pluralism of "Zusammenhänge" and a monism of epistemological method.

IV. THE VALIDITY OF OUR KNOWLEDGE OF REALITY.

The phrase "valid knowledge" is a pleonasm. The problem which is at issue here is the question as to whether or not we are in possession of apodictic knowledge of reality. Schlick gives his answer in terms of a detailed criticism of Kant's epistemology. We can review it briefly.

I. Ibid., P.300.
Kant distinguished three classes of judgments: analytic "a priori", synthetic "a posteriori" and synthetic "a priori". He never questioned the existence of the latter, for in his day the Euclidean geometry, the Aristotelian logic and the Newtonian science seemed to give ample assurance of their existence, and hence it was possible to assume that in these disciplines we could issue apodictic judgments about reality. Consequently his task was simply to invent a system which would account for the existence of the synthetic "a priori". Over against Hume he set up the theory that the mind itself constituted experience, both by the forms of sensuous intuition and by the categories of the understanding. The possibility of apodictic knowledge rests entirely on the correctness of Kant's view.

Modern advances in logic, mathematics, and psychology, however, have destroyed Kant's epistemology at several vital points. In the first place, the nature of mathematics is seen to be tautological. The analytic "a priori" propositions of mathematics and logic can never give new knowledge. A judgment which is truly "a priori" is always analytic. Further, psychology has undermined what Russell calls the "psychological innocence" of Kant. There is no such thing as a subjective space--there are several sense-spaces which are coordinated only by experience. In any case, the objective space of physics is no longer "the" space of perception. It is a completely abstract conceptual creation which corresponds only
in certain formal properties to our perceptual space. Geometry does not proceed from synthetic "a priori" propositions but from conventions. Geometrical systems are perfectly valid so long as they remain merely abstract, but when applied to reality they lose their security. And the time of our experience, with its interpenetration and real duration, is as subjective as are our various sense-spaces.

Kant's categories fare no better than his forms of sensuous intuition. Even such fundamental categories as substance and causality are not used in Kant's sense by modern physics. The proposition that there is a durable constant in all change was for Kant a piece of synthetic "a priori" knowledge which resulted from the application of the category of substance to the unformed material given in the forms of sensuous intuition. Instead of this assumption of a permanent substance supporting attributes we conceive of an object as an orderly "Zusammenhang" or coherent structure of qualities. Neither does Kant's category of causality turn the edge of Hume's analysis. There is no objective necessity. The laws of nature are not real powers which "compel" objects to behave in a certain manner, but are only our expressions for the manner in which objects actually do behave.

Apodictic knowledge about reality does not exist. Hume showed conclusively that the causal principle, which expresses the necessary assumption of all scientific enquiry,
springs from psychological and biological roots. To try to justify it from experience is to argue in a circle. Yet in his assertion that causality is a condition of possible experience Kant expressed the core of a deep truth. It is open to us to refuse to admit the causal principle as an hypothesis, but only at the cost of absolutely ceasing all scientific or philosophical endeavour. The validity of the causal principle and of inductively ascertained truths must be viewed in the light of postulates which are necessary conditions of the possibility of any knowledge whatever.
CHAPTER VII.

HANS REICHENBACH: "EXPERIENCE AND PREDICTION."
"There is no Archimedean point of absolute certainty left to which to attach our knowledge of the world; all we have is an elastic net of probability connections floating in open space."

Hans Reichbach's book, "Experience and Prediction," is an attempt to take seriously the implications which Hume's analysis of the inductive procedure have for any scientific epistemology. Empiricists have always admitted that Hume unfolded the problem of induction in all its rigour, but they have failed to take his conclusions into account in their epistemological constructions. They have remained within the framework of the old two-valued logic, not realizing that such a conception is an idealization of the actual state of our knowledge. We cannot force propositions into the true-false dichotomy, for every proposition about the world of experience involves a prediction, and therefore in the light of Hume's criticism it cannot be strictly verified. Knowledge is a system of propositions to which varying "weights" are coordinated in accordance with the rules of scientific procedure. A modern epistemology must give a major place to these facts in its reconstruction of the world. We must bridge the gap between experience and prediction.
I. MEANING.

The "rational reconstruction" of knowledge which is the task of epistemology can make use of the language form of thinking. "A theory of knowledge must consequently begin with a theory of language. Knowledge is given by symbols—so symbols must be the first object of epistemological inquiry."

In addition to their purely physical characteristics symbols have the property of meaning, a function which they acquire by being put into a certain correspondence with facts in accordance with certain rules of language. Symbols are arranged in groups of propositions, which have three predicates: meaning, truth-value, and weight. By this last term we indicate the fact that, for example, propositions concerning future events possess varying degrees of probability ranging between the two positive and negative truth-values. Where the sentence to be verified concerns a future event, the weight may be considered as the predictional value of the sentence, but the concept of weight can be applied to past events as well. The weight of past events will obviously enter into the calculations of the predictional values of future events which are in causal connection with them.

Positivism and pragmatism have pointed out the relation between meaning and verifiability—what cannot be verified

is meaningless. This "truth theory of meaning" involves two principles:

(1) a proposition has meaning if, and only if, it is verifiable as true or false; and

(2) two sentences have the same meaning if they obtain the same determination as true or false by every possible observation.

If meaning is connected with verification, we must analyse what is meant by "possibility" of verification. Possibility is of three kinds—technical, physical, and logical. We are usually not concerned with a merely technical possibility of verification. Physical possibility "demands only that the fact in question be conformable to physical laws, regardless of human power." Such a concept excludes many statements:

"That the electrons revolve in elliptic orbits around the kernel of the atom, they have a spin, etc., is physically unverifiable in the strict sense of the term. Let us call physical meaning the concept of meaning as defined by the demand of physical possibility of verification. Then the given sentences have no physical meaning."

The concept of logical possibility excludes only contradictory statements and is therefore the widest of the three concepts. Logical meaning is the concept of meaning as defined by the demand of logical possibility of verification. Statements about the structure of the atom have logical meaning because it involves no contradiction to suppose, for instance, that we could shrink to such a degree that electrons would have the

1. Ibid., P.40.
size of tennis balls.

The concept of physical meaning because of its rigour is sounder than that of logical meaning. But we do not believe that statements about the atom are only logically meaningful, even though they are not strictly physically verifiable. We can retain the concept of physical meaning by introducing the notion of "indirect verification." Those propositions which cannot be directly verified but which can be reduced to other propositions capable of direct verification will be called "indirect propositions." Positivism now maintains between the indirect proposition $A$ and the aggregate of direct propositions $(a_1, a_2, \ldots, a_n)$, from which $A$ is inferred, a relation of equivalence:

$$A = (a_1, a_2, \ldots, a_n)$$

This assertion of the equivalence between the indirect proposition and the observation propositions Reichenbach calls "the principle of retrogression."

This relation of equivalence, however, does not hold. For example, $A$ can be inferred from a finite class of observations; but an infinite class of observations can be inferred from $A$, so that the right side of the above equivalence is never completely given. For physical propositions the proposition $A$ has a surplus meaning, and the consequences inferred from $A$ cannot be drawn from the set $(a_1, a_2, \ldots, a_n)$. We really have not a logical but a probability implication from one side to the other, as the inferences in either direction.
may not be absolutely sure. It is consequently impossible to maintain the postulate of strict verifiability for indirect sentences, because such sentences are never equivalent to a finite class of direct sentences. Since science cannot renounce indirect sentences as meaningless, we must give up absolute verification as the criterion of meaning. In other words, we replace the narrow truth theory of meaning by the probability theory, the two principles of which will be:

1) A proposition has meaning if it is possible to determine a weight, i.e., a degree of probability, for the proposition; and (2) two sentences have the same meaning if they obtain the same weight, or degree of probability, by every possible observation. This probability theory is really a continuous expansion of the truth theory of meaning. Each of these two theories is a "verifiability theory of meaning", but in the second one the postulate of verifiability is taken in a wider sense.

A verifiability theory of meaning can be defended against the attacks from the quarter of mysticism, which asserts the existence of "super-empirical" meaning. To rule out such a conception would be the act of a naive intellectualism, for the question of meaning is not a matter of "truth-character" but of definition, and therefore involves a volitional decision. We can, however, coordinate
to propositions which are asserted to have super-empirical meaning other propositions of empirical meaning which have the same bearing upon our actions, so that super-empirical meaning merely "reduces to a surplus suggestive effect."" The 'metaphysical' proposition is deprived of its pretended surplus meaning and reduced to an equivalent non-metaphysical proposition," a procedure which follows from the second principle of the probability theory of meaning and which is in accordance with "Occam's razor."

II. IMPRESSIONS AND THE EXTERNAL WORLD.

So far we have assumed that direct propositions, from which indirect propositions are inferred, are absolutely verifiable. But such an assumption must be given up, for any statement "concerning a physical fact...never refers to a single fact alone but always includes some predictions." We cannot renounce such predictions, for then we would have no way of distinguishing between illusions and material objects, which are only separated by means of their different effects. Observation sentences referring to physical objects are therefore not certain.

Positivism maintains that we can arrive at absolutely verifiable propositions if we confine ourselves to "impressions."

1. Ibid., P.68.
2. Ibid., P.77.
3. Ibid., P.85.
For example, it is not absolutely certain whether the table I see is "a material table or the optical image of such a table produced by a concave mirror." --but at least I see a table. With this view the existence of the external world itself is here brought into question. The positivistic conception of the existence problem holds that, just as the existence of abstracta can be reduced to the existence of concreta, so the existence of concreta can be reduced to the existence of impressions. This idea is an outcome of two basic conceptions: (1) the conception of impressions as basic facts of knowledge, and (2) the truth theory of meaning. "Propositions concerning concrete physical things are, therefore, indirect sentences reducible to impression sentences as corresponding direct sentences; only the latter sentences can be directly verified. According to the principle of retrogression, this correspondence is an equivalence of meaning; therefore this correspondence is a reduction." The sentence "The table exists" means the same as the sentence, "I have impressions of such and such kinds."

We have already seen, however, that the relation between direct and indirect sentences is only a probability connection, not an equivalence. The main idea of the positivistic reduction is therefore not tenable. We must distinguish between two kinds of relations—reduction and projection.

1. Ibid., P.89
2. Ibid., P.101.
The relation, for instance, between birds and the atoms of which they are composed is a "reducible complex", because the existence of the birds strictly implies the existence of the atoms of their bodies. If, however, we noted certain physical effects which proceed from the birds, such as their shadows, we could construct a "projective complex": that is, every proposition concerning the movement of the birds could be coordinated with a proposition about the changes in the shadows. The reduction of the birds to their internal elements (the atoms) expresses an equivalence; but the projection expresses only a mutual probability connection between the birds and the shadows, because natural processes can never be foreseen with certainty. Thus, if we see the birds, there is only a probability inference from them to their shadows; and if we see the shadows, there is only a probability inference from them to the birds.

Because statements about external things are indirect there is only a probability connection between propositions concerning external things and propositions concerning impressions. Since probability connection is the distinguishing feature of a projection, the relation between impressions and things can be classed as a projection, not as a reduction. "The existence of the external things is not reducible to the existence of impressions; the external things have an independent existence." If we still retain the demand for absolute verification, however, the positivistic conclusion 1. Ibid, P.III.
would hold. We must admit that as far as absolute truth or absolute falsehood is concerned observable facts do not furnish a difference between the positivistic theory that things are reducible to impressions and the opposing view that there is a surplus meaning in statements about external things. On the other hand, the probability theory confers different weights upon, and therefore attributes different meaning to, the two theories. For example, since we cannot verify strictly the assertion that external things will exist after our death, such a statement would be meaningless for positivism. On the probability theory, however, this statement gains a higher weight than does the statement that external things will not continue to exist, because we observe that the death of great numbers of people does not affect the existence of external things. Now we have seen that the strictly positivistic truth theory of meaning because of its exclusion of indirect propositions (such as statements about the structure of the atom) is too narrow for science, which has always tacitly assumed the probability theory. And on this theory the conception that external things are not reducible to impressions but are in a projective relation to them and have an independent existence, has a greater degree of probability than the positivistic assertion of equivalence.

The "egocentric language" of positivism, which asserts that things exist only when observed, cannot be said to be "false", for the choice between an egocentric language and the realistic language of science and ordinary life is a
matter of volitional decision. But the decisions which the acceptance of positivism entails, lead, as we have seen, "to a scientific system of restricted character which does not correspond to the system constructed by the realistic language in its full extension." The positivistic insistence on physical truth meaning confines us to an extremely narrow language, which involves the renunciation of any reasonable justification of a great many human actions and scientific statements. The only way to keep free from such restrictions is to choose the concept of probability meaning; and with this choice the positivistic assertion of the equivalence between external things and impressions no longer holds.

III. AN INQUIRY CONCERNING IMPRESSIONS.

Do we observe impressions? We agreed that physical observations, even of the most concrete type, can never be maintained with certainty. Now one of the basic assumptions from which the positivistic reconstruction started was that "impressions" were basic facts, and that propositions about them were capable of strict verification. Reichenbach denies this. For him, impressions do not have the character of observable facts. We observe things, not impressions:

"I see tables, and houses, and thermometers, and trees, and men, and the sun...but I have never seen my impression of these things. I hear tones, and melodies, and speeches; but I do not hear my hearing them. I feel heat, and cold, and solidity; but I do not feel my feeling them."

1. Ibid., P.147.
2. Ibid., P.164.
We do not sense impressions: we infer their existence:

"The distinction between the world of things and the world of impressions or representations is...the result of epistemological reflection...There is no direct awareness of impressions or representations; we must learn to infer whether the things we observe are 'real' or 'apparent', this term meaning that there are processes in my body alone which are not accompanied in the usual fashion by physical things."...

"A sensation of a sensation never occurs; there is only one sensation, its object is an external thing, or a state of our body, and that there is a sensation is not observed but inferred. What is given are things, or states of things...-not impressions."2 "The secondary qualities are qualities of things, not things...We never see 'the blue', but blue things; We never taste 'the bitter', but bitter things."3

This assertion that we observe "things" and infer "impressions" is in direct contrast to Russell's view that we observe sense-data and infer things from them. The issue is extremely involved and a decision between these two approaches is difficult. I think that the problem arises partly as a legacy of the seal-and-wax theory of knowledge and partly from a loose terminology.

For Russell, the primitive part, that which is epistemologically first in our existing knowledge now

"Seems something like this: There are coloured shapes which move, there are noises, smells, bodily sensations, the experiences which we describe as those of touch, and so on. There are relations among these items: time relations...among all of them, and space relations...among many of them. There are recollections of some of these things...There are also expectations."4

Tables, chairs, books, persons are not epistemologically primitive data but are inferences. We do not infer them by any conscious process; but we cannot accept the knowledge of

1. Ibid., P.165
2. Ibid., P.167
3. Ibid., P.168
them as valid knowledge except in so far as it can be inferred from such knowledge as is epistemologically primitive. What we actually see is much less than we ordinarily suppose. Distances, for example, are not seen but are inferred from cues from the eye muscles which are coordinated with experiences of motion and touch.

Reichenbach does not define a "thing"; and furthermore he expressly states that the terms "impression", "presentation", "sensation", and "sense-data" are synonymous. Russell, on the other hand, defines clearly what he means by "sensation". He states that we must distinguish between:

"(1) our sensation, which is a mental event consisting in our being aware of a sensible object, and (2) the sensible object of which we are aware in sensation. When I speak of the sensible object, it must be understood that I do not mean such a thing as a table, which is both visible and tangible, can be seen by many people at once, and is more or less permanent. What I mean is just that patch of colour which is momentarily seen when we look at the table, or just that particular hardness which is felt when we press it, or just that particular sound which is heard when we rap it. Each of these I call a sensible object, and our awareness of it I call a sensation."

There are no such things as "illusions of sense". If in a "illusion" we see two tables then there are two visual tables. It is important to note that Russell defines sensation as awareness of sensible objects—i.e., of patches of colour, etc. That we are aware of such objects can scarcely be doubted, and if "sensation" is simply a name used to designate that awareness it could not be said that we "infer" sensations. We might say with Reichenbach that we observe "things"—but

1. Reichenbach, op.cit., P.89.
the "things" we observe are only certain "sensible objects." Common sense of course "sees things"; but I consider that. Mill, Russell and others have shown quite convincingly that the "thing" is built up unconsciously in actual experience from physiological and psychological habits.

Perhaps the problem has arisen partly as a legacy of the seal-and-wax theory of knowledge. I see a red object. Physics tells us that the redness is "subjective" and is not "in" the physical object. The redness of the object is accordingly placed "in" the mind as an effect or "impression" of the physical object. This "impression" acquired (as with Locke's ideas) almost the status of an entity, and we would presumably have to postulate an "inner sense" which observes the impression. To conceive of an "impression" as an entity between the mind and the object is to commit the mistake which the German positivist Avenarius called "introjection". I think that this is the conception Reichenbach has in mind when he says that we do not "see our seeing," or "hear our hearing."

Actually, the colour of the object is no more subjective than is the shape and position which the object has in perceptual space. The conception that "figure" is a primary quality arises from the misconception that physics deals with objects which are extended in space. The space of extension is perceptual: the space of physics is a non-sensuous, formal construction, as Schlick pointed out. The
fact that we feel it is less permissible to locate the
redness of the paper at the place where we see it in
perceptual space than it is to locate the figure of the
paper at the same point has its basis in psychological habits,
not in logical considerations.

If we use Russell's exact terminology and pay heed to
Avenarius' insistence that sensible qualities are at the
place where they are observed in perceptual space, I think
we can avoid the "entity" conception of impressions. It is
permissible to say that we are directly aware of Russell's
"sensible objects"—i.e., patches of colour, hardnesses etc.
It is true that at a certain middle stage in experience the
statement "There is a red thing" seems to be more direct and
intuitive than the statement "I am aware of a red patch", but
I think that this apparent directness is a prejudice of
common sense which has its roots in physiological habits.
Both genetically and epistemologically these sensible objects
are prior to any "things." Knowledge is this direct
relation between the subject and the sensible object. Noth-
ing is more "real", in Russell's opinion, than such objects
of sense, and certainly nothing can be more strictly
verifiable, since verification always consists in the
occurrence of an expected sense-datum. If Reichenbach's
"impression" means Russell's "sensation", then we have
already defined "impression" not as an entity but as a name
for a certain mental event. If, on the other hand, Reichen-
bach means by "impression" Russell's "sensible object", then
I cannot agree that "impressions" are inferred from things. I can conceive of nothing more direct or primary than Russell's "sensible objects." And as we have already seen, Russell does not leave us with a purely "positivistic" conception of a thing. The thing is a series of events, and is not merely a Machian "complex of elements" dependent on us for existence.

Analysis of the weight of "impression propositions", however, shows that, even though (in Reichenbach's view) they are indirect, they are nevertheless more certain than observation sentences. For example,

"passing from 'There is an electrical discharge from a cloud to the ground' to 'There is a flash of lightning' is a transition to a more certain proposition and, jointly, to a more intuitive one. Passing from 'There is a flash of lightning' to 'I have the impression of a flash of lightning' is a transition, once more, toward a more certain proposition, but to a less intuitive one."

The third proposition is admittedly less "natural" for common sense and requires a certain effort of abstraction, but the concept of intuitiveness is relative to the degree of philosophical perversion we have undergone. It is only physiological habit that makes us consider it more "intuitive" to say that "There is a red thing" rather than "I am aware of a red patch."

Absolute certainty, whatever the status of impression propositions is, can be shown to be a limit which we shall never reach. Even if "basic statements" in the most

1. Reichenbach, op.cit., P.177.
narrow sense were certain, we could never formulate them. Every formulation occupies a stretch of time in which the perceptual function may not remain constant and in which memory might be unreliable. "Our basic statements in the narrower sense are, strictly speaking, basic statements in the wider sense in which the involved time interval is of short duration. Consequently there is only an approximation to basic statements in the narrower sense; and this implies that there is in any utterable proposition only an approximation to absolute certainty." The predicate of weight therefore entirely supersedes the predicate of truth-value and remains our only measure for judging propositions. If we still speak of science as a system of true propositions we are employing a schematization. "For many purposes this conception may be a sufficient approximation; but, for an exact epistemological inquiry, this conception cannot furnish a satisfactory basis." In epistemology we must take seriously the fact that weight is the sole predicate of all propositions. "The concept of truth appears as an idealization of a weight of high degree, and the concept of meaning is the quality of being accessible to the determination of a weight." Even if we assumed that impression propositions were strictly verifiable, the introduction of the impression basis does not free us from probability statements. "It is not only the inferences from the basis to external things which have a probability character; the same is valid for

1. Ibid., P.198.
2. Ibid., P.188.
every statement concerning basic facts...There is no Archimedean point of absolute certainty left to which to attach our knowledge of the world; all we have is an elastic net of probability connections floating in open space."

IV. THE PROJECTIVE CONSTRUCTION OF THE WORLD ON THE CONCRETA BASIS.

In Reichenbach's view the original world from which our reconstruction must start is not the world of impressions but the world of concrete objects around us. If this is true we must first examine the method by which we separate immediate things into subjective and objective. Primitive men and children begin with the presupposition that immediate existence is equivalent to objective existence. But the laws of nature which we construct between these things lead to contradictions if we consider the whole immediate world as real. A thing which has immediate existence can be assumed to have objective existence as well provided no contradiction arises. We favor the waking world as against the dream world because the predictions constructed on the things of the waking world give us a much better ratio of successes. Our inferences about the objective existence of an immediate thing are of a statistical character, and although they have a high weight are never absolutely certain. After some experience subjective and objective things can also be directly distinguished by a "scale of gradation of the immediate existence character", but this criterion is 1. Ibid., P.192.
not so sure a method of distinction.

Once the existence of concreta has been ascertained, they form the basis of inferences leading to the existence of other things which are held to be objective even though not directly accessible. We make probability inferences to other concreta; inferences to abstracta, the existence of which is reducible to the existence of concreta; and inferences to things which are not abstracta but which for physical reasons cannot become concreta either—e.g., radio waves and atoms. These Reichenbach calls "illata." The disjunction of concreta and abstracta is incomplete: "a third term is needed to denote things which are neither concrete—capable of immediate existence—nor abstract—reducible to concreta." It is obvious that this division into concreta, abstracta and illata is "not a matter of principle but due only to our personal situation in the physical world." For example, if the structure of the eye were different such an illatum as a radio wave might become a concretum. Abstracta and concreta may acquire an intuitive character: e.g., "we think of public buildings, of marching soldiers, of a trial, with the intention of attaching the feelings of existence to the word 'state'." Even concreta, however, are not seen "objectively" but in a distorted form: we see a "substitute world." "The descriptional frame in which we see the world is never more than a substitute for a completely true

1. Ibid., P.212.
2. Ibid., P.217.
description and will express only certain more or less 
esential features of the physical object."

For Reichenbach, the construction of the internal world 
also be performed on the concreta basis, since psychical 
phenomena are not observed but are inferred from physical 
things. The resulting conception of psychology is therefore 
emphatically different from traditional views. "The idea of 
introspection is an illusion if we understand by introspection 
an observation of 'psychical' phenomena; what we observe are 
physical phenomena, and the inner processes corresponding to 
them are only inferred." "Having the inner process does not 
mean observing the inner process but means observing the 
immediate thing...We do not see our interior process, but we 
the things we actually see or feel or hear are Russell's 
'sensible objects'--particular patches of colour, particular 
hardnesses, particular sounds, etc. When Reichenbach says 
that we observe physical phenomena he seems to imply that 

1. Ibid., P. 221. 
2. Ibid., P. 227. 
3. Ibid., P. 233.
"physical" denotes a particular kind of reality. Schlick's contention that "physical" denotes merely a particular mode of describing reality is in my opinion the preferable assertion to make. This is also Russell's view: for him, physical objects are those which obey the laws of physics. Schlick's assumption that physical processes and psychological concepts are two different ways of designating one immediate reality seems to give most promise of solving the vexatious mind-body problem, and his clear distinction between perceptual and physical space enables us to avoid the confusion which arises when we try to locate sensuous qualities.

Reichenbach explicitly asserts that "seeing the immediate thing is identical with having the corresponding inner process"; and internal processes "are nothing but physiological processes." Broad, on the other hand, considers that it is "plainly nonsensical" to attempt to reduce a sensation of a red patch to a molecular movement:

"There are some questions which can be raised about the character of being an awareness of a red patch; and conversely. About a molecular movement it is perfectly reasonable to raise the question: 'Is it swift or slow, straight or circular, and so on?' Conversely, it is reasonable to ask about an awareness of a red patch whether it is a clear or confused awareness; but it is nonsense to ask of a molecular movement whether it is a clear or a confused movement. Thus the attempt to argue that 'being a sensation or so and so' and 'being a bit of bodily behaviour of such and such a kind' are just two names for the same characteristic is evidently hopeless."

1. Ibid., P.233.
2. Ibid., P.237.
3. Broad's remarks here do not refute Schlick's hypothesis. Schlick does not "reduce" the sensation of red to a molecular movement. He merely assumes that these are two different concepts which are coordinated to one immediate reality. (Broad, C.D., "The Mind and its Place in Nature", P.26. London: Kegan Paul, Trench, Trubner & Co., Ltd., 1925)
Reichenbach avoids such an argument by his thesis that we are not aware of qualities but of things, and that since the sensation is not observed but inferred we do not "know anything about its qualities except that it has a certain correspondence to the immediate thing observed." We come back here to our former point: do we "observe things", or are we directly aware of primitive sensible objects such as red patches? I prefer, with Russell, to start with the red patches as that which "comes epistemologically first in my existing knowledge now." Reichenbach, however, does not accept behaviourism completely. He considers that "self-observation (as opposed to the objectionable concept of introspection) is a useful method in psychology, but must be subjected to strict control.

V. PROBABILITY AND INDUCTION.

The expansion of knowledge past our own small "observational platform" presupposes the concept of probability. To remain within a positivistic framework of strict verification is to endorse solipsism. "It is the concept of probability which constitutes the nerve of the system of knowledge." When we realize the implications of this fact, we must be ready to admit a fundamental change in the logical interpretation of knowledge.

3. Reichenbach, op.cit., P.293.
The "disparity conception" holds that there are two distinct types of probability: the mathematical concept, which is interpreted in terms of frequency, and the logical concept, which is of a quite different type. It is the problem of the probability of a single case which gives rise to the disparity conception. Thus, when we speak of the probability of good weather tomorrow, the logical concept of probability here occurring seems to be independent of the frequency interpretation. The single-case problem is, however, avoidable, for we can describe the event not as an individual happening but as a member of a class, and such a class can always be constructed. It remains true that for a single case the rules of probability may not give a result which is verified, but it is better to believe in the occurrence of the most probable event as determined by the frequency interpretation, because this principle will lead us to the best ratio of successes which is attainable. On these grounds Reichenbach decides for an "identity conception" of probability: there is only one probability concept, and it is based on the statistical or frequency interpretation.

We utter an individual statement neither as true, nor false, nor even probable--but as a "posit." We may define "weight" as that which "a degree of probability becomes if it is applied to a single case." "Any statement concerning the future is uttered in the sense of a wager." We are obliged to be gamblers because logic offers us no better way to deal with the future.

1. Ibid., P.314.
2. Ibid., P.315.
The probability logic which we construct on this basis is not opposed to the ordinary two-valued logic. It is simply a generalization of the latter, "since it is applicable in case the arguments form a continuous scale of truth-values." As we have seen, "the system of knowledge is written in the language of probability logic; the two-valued logic is a substitute language suitable only within the frame of an approximation." The laws of probability can be reduced to arithmetical laws, and can therefore be fitted into the modern conception of logic as a system of tautological transformations.

Now the probability statement sustains a prediction, and with this fact we are led into the problem of induction. In contrast to deductive inference, which gives only tautological transformations, inductive inference gives us new knowledge. This useful quality, however, becomes the centre of the epistemological difficulties of induction. The two pillars of Hume's criticism of the principle of induction are still unshaken:

(1) we have no logical demonstration for the validity of inductive inference; and

(2) there is no demonstration "a posteriori" for the inductive inference; any such demonstration would presuppose the very principle which it is to demonstrate. "There is no

1. Ibid., P.324.
2. Ibid., P.333.
certainty in any knowledge about the world because knowledge of the world involves predictions of the future. The ideal of absolutely certain knowledge leads into skepticism—it is preferable to admit this than to indulge in reveries about a priori knowledge." If we are to bridge the gap between experience and prediction we must justify inductive belief not by showing that it is merely a habit, but that it is a good habit. If we cannot demonstrate this vital point, our philosophy is a failure.

Analysis of the structure of probability, however, enables us to give this justification. What Hume really has proved is that we cannot demonstrate the truth of the conclusion of an inductive inference. In the face of his argument we must renounce for all time the hope of any apodictic knowledge of reality. But "a justification of an inductive inference does not imply a proof of the truth of the conclusion...The inductive inference is a procedure which is to furnish us the best assumption concerning the future. If we do not know the truth about the future, there may be nonetheless a best assumption about it, i.e., a best assumption relative to what we know." Reichenbach adduces logical considerations to show that the inductive inference can be proved to be a necessary condition of success. A prediction about the future formed on the inductive principle embodies the smallest possible risk. The inductive inference is not a

1. Ibid., P.345.
2. Ibid., P.348.
tautology; but the proof that it leads to the best posit about the future is based on tautologies only. "This paradox is solved by the recognition that the 'something new' furnished by the inference is not maintained as a true statement but as our best posit, and that the demonstration is not directed toward the truth of the conclusion but to the logical relation of the procedure to the aim of knowledge."

The way between the Scylla of synthetic "a priori" theories of knowledge and the Charybdis of scepticism is pointed out by the probability theory of knowledge. "There is neither an absolutely certain knowledge nor an absolute ignorance--there is a way between them pointed out by the principle of induction as our best guide." The two-valued logic is not "false", but it does not apply to actual knowledge because the conditions of its application are not realized:

"The way toward an understanding of the step from experience to prediction lies in the logical sphere; to find it we have to free ourselves from one deep-rooted prejudice: from the presupposition that the system of knowledge is to be a system of true propositions. If we cross out this assumption within the theory of knowledge, the difficulties dissolve, and with them dissolves the mystical mist lying above the research methods of science. We shall then interpret knowledge as a system of posits, or wagers; with this the question of justification assumes as its form the question whether scientific knowledge is our best wager. Logical analysis shows that this demonstration can be given, that the inductive procedure of science is distinguished from other methods of prediction as leading to the most favorable posits.

1. Ibid., P.348.
2. Ibid., P.393.
Thus we wager on the predictions of science and wager on the predictions of practical wisdom: we wager on the sun's rising tomorrow, we wager that food will nourish us tomorrow, we wager that our feet will carry us tomorrow. Our stake is not low; all our personal existence, our life itself, is at stake. To confess ignorance in the face of the future is the tragic duty of all scientific philosophy; but, if we are excluded from knowing true predictions, we shall be glad, that at least we know the road toward our best wagers.

1. Ibid., P. 404.
CHAPTER VIII.

EMPIRICISM: PAST AND PRESENT.
EMPIRICISM VERSUS MYSTICISM.

What is the basic problem at issue when we are dealing with the question of our knowledge of the external world? In its modern form, the question arose from the presuppositions of seventeenth century science. Greek science had, in general, tried to explain the world largely in terms of concrete entities with which we were familiar—in terms of such things as fire, or water, or air. Democritus, however, tried to explain it in terms of the abstract and the unfamiliar—in terms of small particles falling through space, and only accidentally collecting to form larger bodies. When science revived in the Renaissance period, it was discovered that we could be more successful if we adopted the latter technique of explaining phenomena not in terms of the concrete and obvious, but in terms of the abstract and the unobvious. For the medievals, stones fell because of the quality of heanness they possessed, and stones were stones by virtue of the quality of stoneliness. Man was at home in a tidy and warm universe of colours and sounds. But Galileo dispelled this warmth and this colour by his cold and ruthless abstraction. The real world, the objective world, was not the world of experience. There was only matter in motion through time. The success of his technique of abstraction led to the acceptance of his premises, and philosophy took up the task of trying to get over from the world of immediate experience to this cold,
gray world of matter whirling through space.

Berkeley soon questioned the very existence of this abstract matter. If we confined ourselves to "hard" data, we could speak only of mental events, of colours and of sounds. But even Berkeley does not question the testimony of sense experience. On the contrary, he expressly declares that he is willing to "assert the evidence of sense as high as you please." There is, however, one historical theory of knowledge which denies the very existence of any "problem" in our knowledge of the external world—namely, mysticism. To throw mysticism as a theory of knowledge out of court altogether without any examination of it is too naive a proceeding, and because of the appearance of its tenets in various intuitionalistic theories such an examination is necessary.

At the very outset, however, I think it is possible to show that the mystic's position entails certain consequences which will enable us to make a 'volitional decision' in favour of some other standpoint. The mystic cannot be forced to accompany the empiricist along the road which the latter believes will lead to truth, but neither has he the right to force on the empiricist his own conception of truth. Since the nature of reality can never be known at the start of our venture, the empiricist has as good a right to assert that reality will be found in analysis, for
instance, as the mystic has to maintain that reality is a unity which analysis distorts. The point to notice here is that the mystic's position, however unassailable and significant it may be, and however much the mystic is entitled to it, entails an important consequence—silence. The mystical approach does remove the problem of our knowledge of the external world, but it exacts a price which if honestly paid cripples thought and cuts the nerve of all endeavour. We can interpret and defend the empirical position in a much better fashion if we examine the mystic's view first.

Mysticism breaks altogether with the realistic manner of approaching the problem of knowledge. It rejects common-sense divisions as illusions which are merely the products of our finite consciousness. Truth is won not by skilful dialectic, by subtle reason, by arduous analysis, but by a quenching and cessation of all reason in the face of immediately apprehended reality. It follows that the mystic's reality is necessarily one, for variety when consciously faced provokes thought and demands explanation. The world is one because I feel it as one. Its oneness is my own oneness. The world is identical with the knower, and hence the many are essentially illusory. Sense experience, which reveals to us a complex manifold of real objects, is therefore deceptive. Everything is brought by the mystic into the sphere of the personal and the immediate. The All is One, and the mystic, by turning away from the contradictions which
sense experience arouses, can find reality in the direct experience of the self.

With the mystic's definition of the real as that which is immediately apprehended we can have no quarrel, for as a definition it is merely a matter of choice. But why should the mystic attempt to communicate his views? Communication with others presupposes a certain externality, a certain dualism. To communicate with others is to admit their reality and to admit therewith that the world is many and not one. It is sense experience which informs the mystic of animated shapes called men, who presumably have minds. But if sense experience is deceptive, and if reality is to be found within, why should he converse with these shadow-shapes, the mere illusions of his finite consciousness? The consistent mystic would seem to be a completely silent one.

Further, how could the mystic talk even if he wished to? When he looks for truth not in the complex external world given by sense experience but in the depths of the self he, in effect asserting that knowledge is not structural in nature but that its essence is in immediately given content. Now if communication presupposes structure, how could the mystic communicate his experience, which is without form? But it seems tolerably certain that, whatever happens in communication, it is not content but form which is communicated. By "content" we mean the given in experience;
by "form" we mean that as which it is given. The notion of a "common content" between the sender and the receiver of a communication is meaningless, for any observer is necessarily limited to his own experience. Even if an observer could gaze into the minds of two others and compare their contents, he would only report his own experience. Even if he reported a sameness it would still be a sameness in his experience. We are driven to the position that it is therefore form which is communicated. We communicate facts or states of affairs, i.e., we assert that entities of a certain kind stand in certain relations to entities of other kinds. In all this there is no place for the mystic. His experience cannot be doubted, but we have his testimony that it is immediately given, and we have his assertion that reality, being one, is necessarily undifferentiated. Under such circumstances we are therefore forced to the conclusion that he is trying to communicate the unutterable—and this is precisely the complaint of the great mystics themselves.

When we speak of "our" knowledge of the external world, or "our" knowledge of any facts whatever, it is obvious that we presuppose communication of some sort. Historically, advances in knowledge were closely connected with advances in the flexibility and differentiation of modes of communication. From all this sphere of the communicable the mystic shuts himself out. Yet communication is in one sense a more
ultimately a concept than knowledge. If, for example, the mystic cannot communicate what he knows, then as far as we are concerned, he knows nothing. The mystic may assume the position that the world is really one, that ordinary experience is illusory; but the price of silence which he must pay seems too high. I do not think that there is any absolute standard by which we can compare the validity of the mystical approach and that of the empirical approach, but the entailed decisions, as far as communicable knowledge is concerned, point to the latter. With this general defense of the empiricist reliance on sense experience let us return to a survey of the significant features in the development of empiricism as that development has been outlined in the preceding chapters.

II. THE DEVELOPMENT OF MODERN EMPIRICISM.

From Locke to a modern "logistic empiricist" such as Reichenbach is a long journey, but at least it is a journey undertaken in the same spirit throughout. Today we find the union of two streams of thought. Philosophy now recognizes two disciplines: the empirical discipline of the sciences, which are concerned with the collection of the "atomic facts"; and the rationalistic discipline of logic, which deals with the possible structural relations between those facts. It must be admitted that Locke is more concerned with psychological facts than with mathematics, which he attempted to place on an empirical basis, but he
resembles modern philosophers in his close contact with the sciences of his day. His procedure of breaking mental states up into atomic simple ideas, for instance, seems to be inspired by the atomic theory as Boyle was applying it to chemistry in Locke's time, while his genetic method of tracing the rise of complex ideas from simple ones may have been developed under the influence of Sydenham, who brought into prominence the case-history technique in medicine. However mistaken Locke may have been as to the nature of mathematics, he was certainly familiar with its use in the physics of his day. It may have been this familiarity with mathematics which led Locke to place stress on the structural element in knowledge. He realizes, for example, that communication implies structure. It is a property of his simple idea that it is incommunicable. The complex structures of language can by no means communicate the non-composite simple idea. Further, he explicitly rejects the possibility of any knowledge of "essences" or "natures", enterprises which had formed so great a part of previous philosophical inquiry. For him, "general and certain truths are only founded in the habitudes and relations of abstract ideas." Insofar as he recognizes this relational element.

1. In his "Epistle to the Reader", in the "Essay Concerning Human Understanding" Locke designates as "master-builders of the commonwealth of learning" the four scientists, Boyle, Sydenham, Huygens and Newton.

2. Locke, "An Essay Concerning Human Understanding", Bk.IV, Ch.XII, Sect. 7.
in knowledge, Locke's epistemology might be said to anticipate, even if in a rudimentary fashion, the rationalistic discipline to which the "atomic facts" of science are submitted today.

Locke has been criticized for his "subjectivist" habits. He does hold that knowledge extends no farther than our ideas, since the mind has before it no other immediate objects except its own ideas. Following up this line of thought Locke distinguishes between "sensation" as a source of knowledge and "reflection", by which he means "that notice which the mind takes of its own operations", and from which it derives the ideas of thinking, willing, perceiving, etc. It is probably this "inner-sense" theory which is the source of most of the objections to Locke's subjectivism. The mind is set apart from its processes, which it knows in some way by a process of reflection. But even if this phase of Locke's thought is unsatisfactory, his whole stress on the analysis of mental events is of great importance. We should remember that this subjective analysis was forced upon him by the physical science of his time. There was no use in turning to the external world to find the colours and sounds of experience, for Galileo had bereft that world of all such warmth and immediacy. The technique of abstraction which he had inaugurated had been carried to its brilliant conclusion by Newton. The point at
which advance was immediately needed was in the analysis of the domain of the "mental," and at this point Locke revealed his genius. There may be certain crudities in his conceptions, but he started psychology almost single-handed. Psychology may have come to the stage where Locke's introspectionist methods must now be discarded, but it owes its very existence as an independent subject to Locke. The epistemological significance of Locke's psychology must also be noted, for such an analysis was needed to offset the arid rationalistic systems of the continental philosophers.

There is one pragmatic touch in Locke's epistemology which has emerged in later thought as a solution of the problem of the thing-in-itself. Locke, who confined himself to ideas, was forced to give some criterion of their reference to the external world in order that we could distinguish between fact and fiction. His position was that simple ideas are obviously not creations of the mind—e.g., a blind man cannot imagine the colour of red. But if the mind must receive these simple ideas from without, what assurance have we that these ideas are actual patterns of external bodies? Locke answers that it is of no importance whether they image external objects or not. For the knowledge of objects by means of simple ideas we are as well served if our ideas are merely constant and regular effects of qualities in the external bodies as if they were actual patterns. Although simple ideas may thus not
image the external world, the "conformity between our simple ideas and the existence of things is sufficient for real knowledge." The constant and dependable relation between them is "all that our state requires." We have seen this same idea developed by Schlick and Russell with reference to the thing-in-itself. The fact of physiological subjectivity is not destructive of "real knowledge", for even though the things-in-themselves of physics appear to us in perceptual space and time, the relations which are given to us in that perceptual space and time must correspond even if in some purely formal and abstract way to the spatio-temporal relations obtaining between the things-in-themselves. Insofar as our knowledge is structural, we need not speak, then, of an unknowable thing-in-itself, unless we adopt with Fichte an idealism which makes the ego the creator of all reality. Such a view, however, tends to collapse into solipsism.

Locke was also extremely prescient in his stress on the importance of an analysis of language. On a nearer approach, he finds that "there is so close a connection between ideas and words, and our abstract ideas and general words have so constant a relation one to another, that it is impossible to speak clearly and distinctly of our knowledge, which all consists in propositions, without considering first the

1. "Essay", Bk. IV, Ch. IV, Sect. 4.
nature, 'use, and signification of language." He clearly grasps the fact that words are "sensible signs necessary for communication"; that they signify ideas "by a perfectly arbitrary imposition"; and that general and universal terms are nothing but the "creatures of the understanding", employed to facilitate the progress of knowledge. An analysis of language enables him to dispose of the problem of the existence of the universal in short order:

"All the great business of genera and species, and their essences, amounts to no more but this—that men making abstract ideas, and settling them in their minds, with names annexed to them, do thereby enable themselves to consider things, and discourse of them, as it were, in bundles, for the easier and readier improvement and communication of their knowledge; which would advance but slowly, were their words and thoughts confined only to particulars."

In another place he says:

"I shall imagine I have done some service to truth, peace and learning, if, by any enlargement on this subject, I can make men reflect on their own use of language."

Berkeley's spectacular annihilation of matter tends to obscure the fact that it was really Locke who made his attack possible. Locke showed that all our knowledge of the external world was confined to our ideas, yet among these ideas there was none which informed us of matter. He clearly recognized the uncomfortableness of leaving matter defined in this vague way as a "something" which supported qualities. Berkeley, who certainly has the merit

2. Ibid., Bk. III, Ch. III, Sect. 20.
3. Ibid., Bk. III, Ch. V, Sect. 16.
of being rigorous, found no evidence for the existence of anything beyond our mental states. The essential point in Berkeley's argument is the "mental" nature of everything we know, and of our consequent inability to prove the existence of anything non-mental.

This argument has had a great influence on later empirical thought, appearing under various forms such as "phenomenalism", "philosophy of immanence", or "positivism". The concern of Mach and other scientists who took up Berkeley's line of reasoning has been to extrude from science, which ultimately depends on sense observation, the apparently unjustifiable assumption of a matter which is never given in sense. While this bold attempt to free science of the assumption of the existence of something beyond percepts results from a commendable desire for intellectual cleanliness, and while it has greatly clarified the presuppositions of science, it seems that some assumption is necessary to take the place of the old thing-in-itself of philosophy or the matter of science, at any rate if we are to secure a simple statement of scientific laws. Russell maintains that although the theory of the thing-in-itself as ordinarily held cannot be supported, we must find a true interpretation of the basic assumption underlying it, since it is in outline the theory upon which physics and physiology are built. He admits that by resorting to "ideal" constructions the phenomenalist can preserve the whole of physics, at least
formally, but "it is hard to see how anything merely imaginary can be essential to the statement of a causal law", and this is what the phenomenalist really has to assert. Russell considers that phenomenalism is thus incompatible with physical determinism, in fact though not in form. Schlick's refutation of positivism comes back essentially to the same point. Positivism irreconcilably contradicts causality, for the causal principle demands a continuum of the real. If we confine ourselves only to given existents we cannot establish rules of causal succession. Now the existents which we postulate in order to fill in our causal series must be considered as real, for the causal relation only exists between realities. But with this assumption of a transcendent reality the positivistic position is overthrown. Schlick shows further that strict positivism leads to solipsism. Knowledge comes from our sense experience, but we cannot formulate laws describing even the orderly change of perceptions without introducing concepts which must be taken not as mere "Hilfsbegriffe" but as signs for realities which are not directly given.

Reichenbach approaches the question from the point of view of a logical analysis. The positivist asserts that an indirect proposition such as "The table exists" is equivalent to a set of direct propositions about sense impressions. Logical

analysis shows, however, that between an indirect proposition and the set of direct propositions from which it is inferred there is only a mutual probability connection. If we were to remain strictly within the narrow truth theory of meaning, however, the positivist could not be proved wrong. There is only a high probability, not a certainty, for the assertion that external objects exist apart from perception. Thus if we remained within such a narrow framework as the truth theory of meaning entails, we could assert that Berkeley had not been refuted. But on the probability theory of meaning his argument does not hold. Our statements about the external world cannot be completely reduced to statements about impressions, and there is consequently a surplus meaning in them. At the same time, I think we must give Berkeley great credit for making the attack on matter with such clarity and rigour. To question the obvious as Berkeley did is a mark of genius in philosophy.

Hume's contribution, of course, lay in ferreting out the essential principle on which all empirical conclusions are based, namely, the principle of causality. His lengthy train of argument, in which his method of attack is developed largely along the lines already pioneered by Berkeley, has been outlined above and need not be repeated here. As Reichenbach sums up his theory, Hume's main tenets are (1) that there is no logical demonstration for the validity
of inductive inference, and that (2) there is no demonstration "a posteriori" for such inference. Any such argument must inevitably presuppose the very principle it is required to prove, so that our argument is circular. No one of course ever takes this scepticism into practical life, but a pragmatic justification of the principle of induction is not a logical justification. The increasing demands for rigour in logical procedure have made imperative such a justification of induction as we find in Reichenbach's work.

The results of Hume's analysis have led empirical philosophers ever since to put knowledge on a probabilistic basis. What Hume does, in effect, is to put an end to the conception of the synthetic "a priori", and with this the hope of apodictic knowledge vanishes. But possibly his criticism has not shaken science as much as he expected. Science contents itself with a high degree of probability and relinquishes the quest for certainty. By such a renunciation it at once recognizes and escapes Hume's criticism.

If, as Reichenbach asserts, the reduction of matter to mere mental states, as carried out by Berkeley and Hume, represents an inadmissible procedure, how far is Hume's analysis of the ego similarly inadmissible? I have already drawn attention to the fact that Hume himself was dissatisfied with his treatment of personal identity. It is not included
in his later work, the "Enquiry". Mill agreed with Hume's treatment of matter but held that the same analysis was only partially applicable to mind. The facts of memory and of expectation constituted for Mill the difficulty in Hume's account of mind. "A remembrance of sensation", he said, "involves the suggestion and belief that a sensation, of which it is a copy or representation, actually existed in the past; and an expectation involves the belief, more or less positive, that a sensation or other feeling to which it directly refers, will exist in the future." These phenomena, in his opinion, can be adequately expressed only when they are referred to a unified self. We must either believe that if the mind is a series of feelings, it is a series which is aware of itself as past and present; or we must hold that the mind is something different from any such series or possibility of them.

When we come to Schlick, we find that, although he writes in the tradition of Hume and explicitly acknowledges his genius, he nevertheless also holds that Hume's analysis of the mind is only partially true. Schlick is anti-Kantian in most respects, but he considers that Kant was right in distinguishing the unity of consciousness as the fundamental principle of the understanding. Without such unity, every moment of experience would belong to a separate consciousness and there could be no bond between any two such moments.

Even the briefest mathematical operation would be insecure, to say nothing of more complicated mental phenomena. Only by belonging to one consciousness can separate states of consciousness be distinguished, for the act of distinguishing takes place by the relating of separated elements to one another. Wherever there is consciousness there is also unity of consciousness.

Schlick, of course, is not led to any metaphysical assumptions about the ego by such facts. He expressly points out the error of Descartes in this respect, whose famous "cogito, ergo sum" he considers to be really a concealed definition of existence. The consciousness of self is not a factor which always accompanies the course of the conscious processes but is only one content among others, which at times appears under special circumstances.

The stream of consciousness is a process which simply exists; the "I" is its unitary "Zusammenhang," not a person which observes and directs this "Zusammenhang." The unity of consciousness is a basic fact. It cannot be used as a springboard for theories of a soul-substance, but neither can it be denied without involving the suicide of the intellect. Just as the reduction of matter to mental events is attractive and plausible on first sight, but turns out on examination to have certain defects, so the reduction of mind to a mere series of feelings is unsatisfactory. No

external relation such as the causal relation suggested by Hume is adequate to account for the fact of unity.

Schlick criticizes Mill in turn for his theory of matter as a permanent possibility of sensation. Mill's account is perfectly lucid and represents an advance on Berkeley's statement of the idealistic position, but in referring the real to the possible he is guilty of a "petitio principii", for he does not give the requisite explanation of the concept of possibility. An important point in Mill's theory of matter, however, is his stress on the role played by other human beings in helping us to arrive at the very conception of an external world:

"The world of Possible Sensations succeeding one another according to laws, is as much in other beings as it is in me; it has therefore an existence outside me; it is an External World."

Now Reichenbach's refutation of the positivistic view of the external world was based on the fact that experience, by informing us of the apparent independence of the external world of the perceptions of others, thereby makes it probable that the external world is independent of all perception for its existence. Without the existence of others we would probably not attain to the conception of an external world independent of our perception of it.

Russell shows clearly in his chapter "On Our Knowledge of the External World" that the question of the reality of such a world does bring us back to the question of

testimony and the evidence for the existence of other minds. His first assumption in the reconstruction of the world from our "hard" data was similar to that of Leibniz in his "Monadology". Every mind looks out on the universe from a point of view peculiar to itself. Assuming for the time being the validity of testimony, Russell then proceeds to the task of correlating the various perspectives into a unified system. As far as testimony is concerned, Russell holds that there is no logical demonstration to show that other minds exist. Analogical arguments are inconclusive. The hypothesis that there are minds associated with other bodily organisms, however, does not contradict experience at any point, and enables us to extend our knowledge past the sphere of our own private world. Now when we come to Reichenbach, we do not find him concerned with the question of testimony, but we do find him attacking the very conception of "private worlds" which are inaccessible to other minds:

"There is something in our experience, so it is said, which is accessible only to ourselves, and which cannot be communicated to other persons. We see the color red, we feel the heat, we taste the sweet; but we cannot tell how we see or feel or taste it. Other people tell us that they also see the red and feel the heat and taste the sweet; but we never can compare these sensations with ours, and so we do not know whether they are the same. There is, therefore, an unutterable residue in our experience. This is one of the most frequently used arguments in favor of the existence of a particular psychical world within every person; this world is supposed to be known only to each person and not accessible to others."

The comparison of the impressions of two persons cannot even be accepted as a meaningful problem unless we have first some "definition of co-ordination." If all the reactions of the two persons, including reports of self-observation in stimulus language, are the same, we may define their impressions as being the same. Such sameness, however, as Reichenbach admits, is not an absolute sameness but only the sameness established by the definition. The notion of "common content", to use another phrase, is meaningless because unverifiable—but does this prove that there is nothing given in experience which is incommunicable? Reichenbach apparently holds that it does:

"There is an outcome of the usual erroneous conception of the problem of incomparability which we must now discuss: it is the idea that there is something inexpressible in our experience, known to us alone but not communicable to other persons. The structural relations between impressions have been distinguished from the specific quale of each of them; only the structural relations, it is said, are communicable; the quale is known only to ourselves. The fault of this conception, it seems to me, lies in the idea that we ourselves know more than structural relations. We see differences between red and green; but to say that we see, in addition, a specific quale of the red means nothing...If we had no possibility of observing similarities, i.e., if there were no two similar impressions in the whole stream of experience, the idea of a specific quale would not have arisen."

In Reichenbach's opinion it is only a certain limitation of the power of imagination which leads to the idea that there is something inexpressible in our experience:

1. Reichenbach, op. cit., P.249.
2. Ibid., PP. 253-4.
"We say, Whoever wants to know what is red must look at a red thing. But we do not say: Whoever wants to know what is an elephant with six legs must look at such a thing. The red, therefore, is called an inexpressible quale; the six-leggedness is not. This is a rather incorrect mode of speech. We ought to say: There are certain differences which we cannot imagine without having seen them before. It is a certain indigence of fancy which we have to state here—no more."

This is certainly a sweeping condemnation of Russell's monadological theory and of Wittgenstein's assertion of an "unutterable" element in experience. Reichenbach's attack on such views stems directly from his rejection of the traditional "psychical phenomena" of older philosophers. For him, psychical phenomena are not observed but are inferred. We see things and infer impressions. This brings us back to the controversy of the last chapter. My position is that we probably should not retain the older mode of expression as regards the observation of impressions, since we are then led into some "inner sense" theory. But if we are to say that "We see things" it should be remembered that the "things" we see are such existents as Russell's "sensible objects"—i.e., patches of colour, sounds, hardnesses, etc. Russell's view is that these are the ultimate "hard" data, those which resist further analysis; whereas the "things" of ordinary experience are "soft" data, and can be broken up by analysis into more primitive elements. I hold further that if we adopt Schlick's views with respect to the meaning of "physical" as denoting not a particular

1. Reichenbach, op. cit., P.256.
kind of reality, but a particular mode of description of reality; and if we retain his clear distinctions between the subjective space of the psychologist and the objective, abstract space of the physicist, we can carry through Russell's views without running into inconsistencies on the mind-body problem. Reichenbach's reconstruction starts out from the world as it appears to an ordinary individual untrained in philosophy. Such a person is always a naive realist, and is quite sure that he "sees things." Russell prefers to start from that which comes epistemologically first in his experience now--i.e., after critical reflection on the situation has led him to reject the naive views of common sense. His procedure of questioning the obvious and getting down to "hard" data before he starts to rebuild is the one which I prefer to follow in this matter.

Possibly much of Reichenbach's criticism of the theory of the unutterable element in our experience is to be accepted, but I do not think it can be maintained that there is nothing incommunicable in our experience. The separation between form and content cannot be carried out too rigidly, but I consider that we can distinguish in experience between the given--the "this"--and that as which it is given. It is admittedly somewhat loose to speak of specific qualia. To say that we see a specific redness of red is to run the risk of getting involved in the meaningless discussion of "common content." All that we can communicate about the difference
between red and green, for example, must be expressed in terms of relations of similarity and difference, but the fact that there is in ordinary experience a basis for distinction indicates some element of givenness in experience which has to do with content and not mere structure.

I would agree that we "know" no more than structural relations, but only because by "knowledge" I understand "communicable knowledge." But if we follow Russell's theory of "sensible objects" instead of admitting with Reichenbach that we see things, it is still possible to be directly "acquainted" with a given element in experience. As Reichenbach says in the above passage, it is perfectly true that if we had no possibility of observing similarities in the whole stream of experience, the notion of a specific quale would not have arisen; but it is difficult to see just what else could possibly have arisen either. Certainly "experience" itself would be a meaningless concept. Further, the advocates of the view that there is an incommunicable residue left in experience after the structural part is communicated could use their doctrine to explain Reichenbach's example of the elephant. For them, because the red is a given element, it can be known only in direct acquaintance, whereas the six-leggedness, because it has to do with such things as particular shapes and relations is of a formal nature.
There are limits to imagining even six-leggedness. A blind man could not realize in visual imagination a six-legged elephant, because visual space itself must be given in experience. If all we have in perceptual experience is pure structure, why can we not imagine an elephant which would have no colour at all? Is it not because the form in perceptual experience must have some content to fill it in? In all non-mathematical thinking, as Schlick points out, abstractions must be represented in concrete perceptions. But in perception we never find form apart from content—e.g., we never find abstract visual extension apart from some colour.

In one sense this controversy is unimportant, because insofar as empiricism is concerned, this incommunicable residue, even if it does exist, is left out of account. Russell points out that we do not know the thoughts of Bach and Shakespeare. But their thoughts are unimportant to us. Their whole social efficacy depends on certain black marks which they made on paper. Whatever happens in communication, it is clear that structure only is communicated, and it is effected by external means. Content is in any case left out of consideration.

Wittgenstein, who certainly could not be accused of being tender-minded, holds the view that there is an unutterable element in experience, and he considers that it is this element which the mystic is endeavouring to express.
Schlick maintains that real knowledge is concerned with the structure of the symbols which we order to reality, but he also does not deny that there is such an element in experience as direct acquaintance—"bloßes Erleben." If Reichenbach is correct in maintaining that there is nothing inexpressible in experience, one wonders just what place there is for the poets. Could Wordsworth, for instance, express himself in dry-as-dust logical propositions? The most plausible explanation is that by evoking our imaginative assent he is endeavouring to produce in us the immediate, warm feeling which he has in the presence of Nature. The view that Wordsworth had no immediate world of private experience would seem to render his work of equal value with such fascinating lines as "All mimsy were the borogroves."

Returning to Russell, we must note that his work has been strongly influenced by the necessity he feels for dealing with Berkeley's attack on the external world. The empirical successes of the notion of matter indicate that that conception has some legitimate function to perform, yet Berkeley shows that only mental states are given to us. Only they are "hard" data. The problem of the knowledge of the external world, as Russell puts it, is to get by means of logical constructions from these hard data over to entities which will be adequate for science. While admitting that Berkeley's attack is very powerful, Russell holds with Schlick and Reichenbach that it is highly probable that
our perceptions have external causes, and that there is an objective world existing independently of them. The physical object to be inferred from perception, however, is not a simple "thing" but a group of events. Physics can dispense with the old notion of permanent things undergoing changing states, and can regard a piece of matter as a connected string of events. Berkeley, of course, did not claim to be a solipsist by maintaining that our perceptions did not have external causes. If alive today, he would probably take out a life insurance policy. His argument was that, since all experience came to us through mental states, the cause of those states must be some Mind. Russell admits that our hard data are limited to mental events, but he considers that "the only legitimate attitude about the physical world seems to be one of complete agnosticism as regards all but its mathematical properties." Physical knowledge is mathematical and structural, and so very abstract that the properties which it demonstrates of phenomena might belong to groups composed of any kind of material. Our subjective situation prevents us from knowing what the intrinsic nature of the material is, but to assert, for instance, that it "must be very different from percepts is to assume that we know a great deal more than we do in fact know of the intrinsic character of physical events."

2. Ibid., P.263.
Physics leaves open all kinds of possibilities as to the intrinsic nature of the phenomena to which its equations apply. Russell himself favors the position of neutral monism.

Schlick's emphasis on knowledge as a recognition in a new situation of something already known develops from his view that knowledge is not found in the direct intuition of the mystic or the direct acquaintance of ordinary perception, but that it is concerned with the relations obtaining between the symbols which we co-ordinate to features in reality. Concepts and judgments are merely signs made to correspond to objects and states of affairs. Truth lies in the adequate and unequivocal designation by a judgment of a state of affairs. Truth is not an immanent property of a judgment. A judgment is true or false only by virtue of its place in a system of knowledge.

Schlick rejects the positivistic reduction of the external world to "element-complexes", and postulates a thing-in-itself which is a complex of objective processes. But we have seen that this thing-in-itself, because knowledge deals only with structure, is not unknowable. The thing-in-itself is given to us in perceptual space and time, so that we cannot "know" it after the manner of direct acquaintance, but the structure of the 'appearance' we deal with must correspond in a formal way to the structure of the thing-in-itself, which is therefore completely knowable.
The clear distinction which Schlick makes between the space and time of perception and the abstract conceptual space-time of the sciences, together with his view that "physical" denotes not a particular kind of reality, but a particular way of describing reality, enables him, as already shown, to suggest a possible solution of the mind-body problem. His assumption is that physiological and psychological concepts are merely two ways of describing the one immediate reality of awareness. A proper understanding of the abstract nature of physical knowledge permits us to apply the physical mode of description to all parts of reality. No essential distinction between the qualities of the world need be assumed. Following Hume in the denial of the synthetic "a priori", Schlick asserts that we are not in possession of apodictic knowledge about reality. The causal relation is not an "a priori" principle but is a postulate to which we must subscribe if knowledge is to be possible at all.

Reichenbach's work is an attempt to take into account the probability element in our knowledge. Nearly all empiricists have admitted that knowledge is an approximative system which will never become true, but this approximative character has not been counted among the essential features of knowledge. But the conception of knowledge as a definitive system is a fiction, and the treatment of such a schematization as representing the actual state of our knowledge leads to serious errors. Reichenbach holds that the key to an
understanding of science is contained within the problem of probability. We have seen how he applies the conception of probability in the domain of the verifiability theory of meaning, where he shows the definite failure of the narrow truth theory of meaning and the necessity for the adoption of a probability theory of meaning. Science cannot do without "indirect" propositions, but since these are neither strictly verifiable nor strictly equivalent to the "direct" propositions from which they are inferred, they can find no place within the narrow truth theory of meaning, which we therefore reject in favour of the probability theory.

To bridge the gap between experience and prediction we must give a justification of the principle of induction. This justification must amount to a demonstration. We cannot leave the matter as Hume did by merely showing that induction is a habit. Unless it is possible to show that it is a "good" habit, our philosophy is a failure. Reichenbach shows that such a justification of the inductive inference need not imply a proof of the truth of the conclusion, and is therefore possible. Logical considerations can be adduced to demonstrate that the inductive inference is a necessary condition of success in prediction of the future. The inductive inference itself is not a tautology, but logical analysis can show that it is the best posit about the future, and this is all the justification we require. Knowledge is interpreted as a system of wagers or posits, and "the
inductive procedure of science is distinguished from other methods of prediction as leading to the most favourable "posita about the future.

III. EMPIRICISM AND THE FUTURE COURSE OF PHILOSOPHY.

To attempt to forecast any particular development of philosophy is rather hazardous. I believe, however, that we have reached a certain point in philosophy where it is possible to predict the general trend the future will take. Thus it appears probable, for one thing, that the formulation of all-inclusive systems of thought such as have been found in the classical tradition belongs to a past age. We seem to be concentrating more and more on specialized problems within the fields of philosophy, largely as a result of the introduction of scientific method. The extreme gulf between philosophy and science in the last century tended to assign to philosophy the region of airy fancies and abstruse metaphysics for its province. But the inquiries into the bases of scientific procedure, necessitated by the collapse of older thought-foundations, have brought philosophy and science together again. Philosophical thought has been engaged to a greater extent than ever before with scientific problems, and the resulting contact with science has led to the attempt to introduce scientific method into philosophy. We need only recall the mode of approach to philosophy undertaken by such men as Russell, Schlick and Reichenbach, not to mention many 1. Reichenbach, op. cit., P.404.
others, to realize the impressive results which have been achieved by this new technique in philosophy.

The piecemeal method of attack on philosophical problems, which is responsible for these recent advances, has thus tended to debar philosophers from the construction of great thought-systems. In this connection we should also point out one important discovery which has been made in our own time, namely, that concerning the nature of mathematics. In all ages the fascination of mathematics has led thinkers to pure "a priori" speculations. It seemed that here we had proof of the existence of the synthetic "a priori", and if that were true, then why could we not in other fields erect firm systems of truth, patterned on mathematical systems, without any reference to empirical facts? But today the theory of mathematics as a system of tautological transformations has rudely shaken if not completely destroyed our faith in such rationalistic enterprises. We can still construct those "a priori" systems, but we no longer believe that we are reaching any new truths. From another point of view, then, we are witnessing the return of philosophy to empiricism, although it remains true that empirical systems must undergo the strict scrutiny of logic.

If mysticism is dealing with the unutterable, and if pure rationalism is undermined by the formalist theory of logic, it is not therefore too hazardous a prediction to say that philosophical thought will continue, for at least
a considerable period, to be dominated by the empirical outlook. It is true that even in ancient times empiricists and sceptics cast aspersions on the theories of the classical philosophers, who continued to thrive nevertheless, but the older empiricists did not have scientific knowledge or method to reinforce their position. To say that the empirical approach will prevail is of course not to say that we will proceed calmly and uninterruptedly on our path with no surprises. The development of science will probably demand radical adjustments of our present views. No Paduan complex should lull us into any comfortably false view of the situation. Science might eventually break down. We have no assurance that the world is as rational as Galileo assumed; it may not be of such a nature that it can be caught in the net of our reason. But if by scientific method we understand an unprejudiced search for truth, a refusal to force facts into the Procrustean bed of our theories, and a willingness to recognize those limitations of our reason so soberly demonstrated by empiricists in all times, then I believe that philosophy must inevitably adopt that method. The quest for certain knowledge must be given up, and, as Russell points out, many of the more humanly interesting problems which have naturally occupied the thought of men at all times may not be answered or may be discovered to be incapable of solution. But even though our progress seems slight in comparison with the sweeping claims put forth by traditional philosophy we may
at least have the assurance that our steps will not need to be retaken, and that we shall be able to implement the modest promises we have given.
Chapter I.

Chapter II.

Chapter III.


Chapter IV.

Chapter V.


Chapter VI.

Chapter VII.