BERTRAND RUSSELL, as Philosopher

C. D. BROAD†

Bertrand Arthur William Russell was grandson on the paternal side of the Whig statesman Lord John Russell (1792–1878). The latter was a younger son of the sixth Duke of Bedford (1766–1839), and was created Earl Russell and Viscount Amberley in 1861. Lord John Russell's eldest son (by his second wife Frances Anna Maria Elliot, daughter of the Earl of Minto) was John Russell (1842–1876). The latter bore the courtesy title of Viscount Amberley; but, dying before his father, never became Earl Russell. He married in 1864; and became the father in 1865 of Bertrand Russell's elder brother John Francis Stanley Russell (1865–1931), and in 1872 of Bertrand Russell himself. The former became second Earl Russell in 1878, on the death of his paternal grandfather. He died, much married but without legitimate male issue, in 1931, whereupon his younger brother Bertrand succeeded as third Earl Russell.

Bertrand Russell's mother was Katherine Louisa Stanley (1842–1874). She was a daughter of the second Lord Stanley of Alderley (1802–1869) and the latter's wife *née* Henrietta Maria Dillon (1807–1895). The former was a descendant of Gibbon's Lord Sheffield (1735–1821), and the latter was a highly original and outspoken member of a noble family of Irish Jacobites. Through his mother Bertrand Russell was nephew to Rosalind Stanley, who became Countess of Carlisle, and was a celebrated and highly cranky *grande dame* in her day. Through the latter he became related by marriage to that eminent classical scholar Gilbert Murray (1866–1957), whose wife, Lady Mary, was a daughter of Lady Carlisle.

On the death of his father in 1876 Bertrand Russell, then four years old, went to live with his paternal grandparents at their house Pembroke Lodge in Richmond Park, which had been presented for life to his grandfather in the 1840's by Queen Victoria. Two years later his grandfather died at the age of 86. Bertrand's elder brother Francis was sent in the normal way to boarding schools. But Bertrand himself was educated within the home, under the control of his grandmother and her unmarried daughter Lady Agatha Russell, by a sequence of governesses and tutors until the age of 16. The religious atmosphere of the home was that of broad-church Protestant Christianity.

From the age of about 14 to 16 Russell, as a result of much private reading and reflexion, came to reject first revealed religion, and then the standard philosophical arguments for theism, for human survival of bodily death, and for free-will. Naturally, he felt obliged to conceal all this from his grandmother and his aunt Agatha. In his *Autobiography* he sums up the situation as follows: "After the age of 14 I found

---

† Professor Broad died in March 1971 shortly after writing this article.

[BULL. LONDON MATH. SOC., 5 (1973), 328–341]

living at home only endurable at the cost of complete silence about everything that interested me ".

Just at the beginning of his 17th year Russell was sent away from home for educational purposes for the first time. It was not to an ordinary school, but to a cramming establishment at Southgate, then in the country, in Middlesex. Here he was to be specially coached for the Entrance Scholarship Examination at Trinity College, Cambridge. Most of his companions were rather stupid and backward young men, being crammed for entrance examinations which were a necessary hurdle in the way of becoming professional officers in the army. He found little in common with them, was much more shocked by their habitual conversation than a boy of more normal upbringing would have been, and was subjected at first to a certain amount of rough teasing and minor bullying. However, he managed to keep his end up; and the coaching in mathematics which he received must have been pretty efficient.

In the December of 1889 Russell took the Entrance Scholarship Examination at Trinity. He was awarded a Minor Scholarship in mathematics, and he took up residence as a freshman in October 1890.

A. N. Whitehead (1861–1947), who was to be so much associated with Russell's later work in logic, had been one of Russell's examiners. He had noted the outstanding ability of Russell and of another successful candidate, C. P. Sanger, who soon became one of Russell's closest friends. Whitehead therefore recommended them both (of course without their knowledge) to those running the ancient Cambridge society of intellectual *élites* known to those who were aware of its existence as " The Apostles ". Russell was elected to it in 1892, and it played a very important part in his early life in Cambridge. Among those other members who already were or were destined soon to become distinguished philosophers, were, beside Whitehead himself, J. E. McTaggart (1866–1925) and G. E. Moore (1873–1958).

Russell first studied mathematics, and was classed as seventh Wrangler in the Mathematical Tripos. He then switched over to the study of philosophy and took a first class in Part II of the Tripos in " Moral Science ", as Philosophy was then termed in Cambridge. In 1895 he was elected to a Fellowship of Trinity under the then Title (α). Such a Fellowship, popularly known as a " Prize Fellowship " was awarded on the result of an annual competition, at which candidates were confined to members of the College below a certain age, and at which each candidate submitted a dissertation on a subject chosen by himself. Such a Fellowship lasted for six years, and involved no duties of residence, teaching, or research. The dissertation on which Russell was awarded his Fellowship, combined his mathematical and his philosophical interests, and it became the basis of his first published philosophical book " The Foundations of Geometry " (1897).

At this point it will be convenient to append a list of Russell's main philosophical publications. Some of these were books, and others were important papers in various philosophical journals. In the case of the latter I attach the name of the journal in which the paper first appeared.

Year	*Title*
1897	Essay on the Foundations of Geometry
1900	Critical Exposition of the Philosophy of Leibniz
1903	The Principles of Mathematics
1904	Meinong's Theory of Complexes and Assumptions (*Mind*)
1905	On Denoting (*Mind*)
1906	The Monistic Theory of Truth (*Mind*)
1910	Principia Mathematica (with Whitehead) Vol. I
1911	Knowledge by Acquaintance and Knowledge by Description (*Proceedings of the Aristotelian Society*)
1912	Principia Mathematica (with Whitehead) Vol. II The Problems of Philosophy On the Relations of Universals and Particulars (*Proceedings of the Aristotelian Society*)
1913	Principia Mathematica (with Whitehead) Vol. III
1914	On the Nature of Acquaintance (*Monist*) On the Relation of Sense-data to Physics (*Scientia*) On Scientific Method in Philosophy (*Herbert Spencer Lecture* in Oxford) Our Knowledge of the External World
1915	The Ultimate Constituents of Matter (*Monist*)
1918–19	Philosophy of Logical Atomism (*Monist*)
1919	Introduction to Mathematical Philosophy On Propositions: What they Are and How they Mean (*Proceedings of the Aristotelian Society*)
1921	Analysis of Mind
1924	Logical Atomism (Contribution to *Contemporary British Philosophy* Vol. I)
1927	Analysis of Matter An Outline of Philosophy
1940	An Inquiry into Truth and Meaning
1944	" My Mental Development " and " Reply to Criticisms " (Contributed to " The Philosophy of Bertrand Russell " in *The Library of Living Philosophers*) A History of Western Philosophy
1948	Human Knowledge: Its Scope and Relations

The above list represents Russell's most important contributions to philosophy in a period of some 50 years, during which he had many non-philosophical interests and occupations.

The first point to note is the fundamental breach between the philosophical position of the " Essay on the Foundations of Geometry " and that of all Russell's later works.

Up to about 1897 Russell's philosophical views, like those of most of his British contemporaries, might be described as in general idealistic and in particular semi-Kantian. " The Foundations of Geometry " is dedicated to McTaggart, who was to become the most eminent of English idealist philosophers. And in the Preface Russell says that his main obligations in Logic are to Bradley, Sigwart, and Bosanquet. Kant had held that Space is an innate form which each human percipient imposes on everything that he can perceive as external. Russell's doctrine is on these lines, though it is much more abstract and hypothetical, and is based on a much deeper knowledge than Kant had or could have had of the various different types of geometry.

Very soon after this Russell's general philosophical position changed fundamentally, and it never reverted to anything of the nature of idealism. This was due largely to the influence of his slightly younger contemporary G. E. Moore. Russell, when in his third year at Cambridge, met Moore, then a freshman at Trinity, and was immensely impressed by him both as a person and as a thinker. Moore himself was for a while, under the influence of McTaggart, a kind of Hegelian. He emerged from this position through his own reflexions earlier than Russell, and it was through Moore's conversation that Russell came to abandon idealism. (Moore's famous article " The Refutation of Idealism " appeared in MIND in 1903). This influence is apparent in Russell's " Principles of Mathematics " (1903), where it appears in a rather crude naive " realism " (in the mediaeval sense) concerning universals and their necessary connexions and disconnexions, which are held to be knowable *a priori*, either by direct inspection or indirectly by logical demonstration.

In this book Russell accepted Meinong's very literal view of the relations between words and phrases and sentences, on the one hand, and various kinds of non-verbal entity, on the other. But very soon afterwards he rejected this, in view of the difficulties to which it leads in connexion with such sentences as " Round squares do not exist ". This was in his paper " Denoting " (1905). This negative conclusion soon led on to a certain positive doctrine, which was one of Russell's most important contributions to philosophy in general, and which was destined to have a profound influence on the further development of his own philosophical views. This began with the analysis of " Definite Descriptions " (e.g., such a phrase as " The man in the iron mask "), and developed into the wider theory of " Incomplete Symbols ". This positive doctrine is fully stated and argued in Russell's classical paper " Knowledge by Acquaintance and Knowledge by Description " (1911).

The essential point of the analysis of Definite Descriptions is this. One starts with an intelligible sentence in the indicative (e.g., " The man in the iron mask was French "), containing as grammatical subject or object a definite description (e.g., " The man

in the iron mask "). One substitutes for it a set of inter-connected sentences having the following properties: (*a*) None of them contains the original, or any other, descriptive phrase. (*b*) Together they convey all the essential information which the original sentence would convey to a person who used it understandingly himself or who understood it when used by others.

Russell argues that a person can understand a descriptive sentence only if he knows *by acquaintance* every term (particular or universal) which is named in any of the sentences which together constitute the analysis of the original sentence.

Now Russell's theory of " incomplete symbols " and of " logical constructions " may be regarded as a general philosophical method, of which his analysis of definite descriptions was the first outstanding instance. The general theory may be put very roughly as follows. Certain words or phrases (e.g., " point ", " chair ", " mind ", " atom ", etc.) occur frequently in sentences which we all often use and in some sense understand. In many cases, moreover, one claims to know, or to believe with reasonable conviction, that there are entities corresponding to such words and phrases, and that there are facts corresponding to such sentences. But, when one considers what could be the nature of such entities, one often finds that it is of a highly speculative and doubtful kind, and that such an entity (e.g., an atom), would be very unlike anything that we know by acquaintance or could describe in terms so known.

So far as I can see, Russell's general recommendation in such cases is this: Try to replace any sentence which contains such a word or phrase by a set of inter-connected sentences having the following properties. (*a*) None of them contains the word or phrase in question or any mere substitute for it. (*b*) Together they convey all the essential information conveyed by the original sentence. (*c*) The names and phrases which occur in them either are, or approximate as nearly as possible to, the names of such entities as one is or could be directly acquainted with.

Russell's philosophy consists largely in successive attempts to carry out this general recommendation in more detail and further and further. An important and typical example in *pure logic* and the theory of mathematics is Russell's analysis of sentences in which the word " class " or any particular class-name (e.g., " man ") occurs. This appears first in *Principia Mathematica*, Vol. I, (1910). Here any such word is treated as an incomplete symbol. Any sentence in which it occurs is replaced by a certain set of inter-related sentences, in which it does not occur, but which are about the values of certain *propositional functions*. Russell does not deny that there may be entities of a special kind denoted by class-names. But he regards this as doubtful, and on that ground prefers to treat all such names as incomplete symbols and to analyze them away on the lines suggested.

We are concerned here rather with Russell's *ontology* than with his theories of logic and of pure mathematics. By this I mean his philosophy of (*a*) the commonsense beliefs which a person has about himself, about other men, and about the non-human things and events in the external world; and of (*b*) the development and organization of these beliefs provided by such sciences as physics and psychology. Now, as we have

seen, an essential feature in the general procedure recommended by Russell is this. The names and phrases which occur in the sentences substituted for one containing an incomplete symbol should approximate as nearly as possible to those which denote such entities as one is or could be *directly acquainted with.* The development of Russell's ontology has consisted in trying to reduce more and more the number of different kinds of entity fulfilling the above conditions. I will now trace this process in more detail.

We may consider in turn the following two *prima facie* dualisms, viz., (1) that of universals and particulars, and (2) that of material and mental particulars.

(1) *Universals and Particulars.* The question here is whether it is necessary to hold that there are *universals*, i.e., qualities and/or relations, or whether we can get on with only particulars. Russell has argued throughout that universals, of one kind or another, are an indispensable factor in reality; though his views have varied considerably in detail in his various successive publications. Essentially his final position is that at the very least we must admit the reality of the *relation of similarity;* that, if one does this, there can be very little ground for denying that of other *relations;* and that, if one goes so far, there is no very good reason for doubting the reality of *qualities.*

(2) *Different Kinds of Particular.* Russell has never doubted that there are *particulars.* On his view anything that a person is " acquainted with " (in his technical sense of that phrase) in sense-perception is a particular; and it is certain that each of us is acquainted from time to time in sense-perception with this or that object. The question for him has been: What are the ultimate different kinds of particular? How few different kinds need to be accepted? How many of the various allegedly different kinds can be dispensed with by means of appropriate logical constructions in terms of the one or the few which have to be accepted?

We may distinguish the following three different kinds of question which have arisen for Russell in this connexion. (i) A distinction has commonly been drawn, both in the case of material particulars and in that of mental ones, between, on the one hand, " things " or " substances " or " continuants ", and, on the other hand, " events " or " processes " or " occurrents ". (An example would be the difference between a chair or a mind, on the one hand, and a flash of lightning or an experience of a twinge of pain, on the other.) (ii) Whatever decision we may reach on the above *categorical* distinction, as it might be called, we shall be left with another distinction which is commonly drawn between two kinds of particular, viz., *material and mental ones.* These have been alleged to be fundamentally different. (An example would be the difference between two such things as a chair and a mind, or two such events as a flash of lightning and an experience of feeling a twinge of pain.) (iii) Whatever conclusion may be reached as to (i) and (ii), the following questions, which may be called *epistemological,* remain for Russell. In the case of (*a*) *material* particulars a distinction is drawn between (α) the alleged immediate data of *sensation* (e.g., a roundish-looking, red-looking, visual sense-datum); (β) ordinary everyday *perceptible*

things and events (e.g., a chair or a flash of lightning); and (γ) the *imperceptible* things and events postulated by physical science (e.g., a proton or an electron, or the motion of one of the latter about one of the former). And in the case of (*b*) *mental* particulars a sharp distinction is often drawn between (α) *one's own* mind and *one's own* experiences, on the one hand; and (β) on the other hand, the minds and the experiences of persons *other than oneself.* It is often held that one is directly acquainted with the former, and that one can know about the latter only very indirectly. How is one's alleged knowledge of the more remote and out-of-the-way of such objects related to one's knowledge of those with which one is directly acquainted?

Now Russell is concerned with questions arising under each of the above three headings. In the immediate sequel I will consider the development of his thought on topics concerned with (i) and (ii).

(i) " *Things* " *and* " *Events* ". The position in regard to this question which Russell reached fairly early, and which he never afterwards saw reason to abandon, is this. The fundamental particulars, whether material or mental, are *events or processes.* Substance-names are incomplete symbols. The sentences to be substituted for one containing such a name contain only the names of *events*, and of certain complicated relations between the latter, which Russell endeavours to specify. When Russell asserts this, his statements must be understood as follows. By a " particular " he means something which exists in time; and which, if it also exists in space, cannot occupy more than one place at any given time. And by an " event " he means something that exists for a short stretch of time; and which, if it is extended, occupies a small finite region for such a stretch of time.

(ii) *Material and Mental Particulars.* On this topic there is a fundamental change in Russell's views with the publication in 1921 of his "Analysis of Mind ". Up to then he had held that there are two different kinds of particular, viz., material and mental; though he had altered his views from time to time as to what were the ultimate kinds of mental particular. Thus, in " Problems of Philosophy " (1912) he held (though with some hesitation) that each of us at each moment is acquainted with *himself* as subject of various experiences, existing at any rate for a brief period ending with that moment. By 1914, in " The Nature of Acquaintance " he had come to hold that one is *not* acquainted with oneself as subject, but is acquainted only with certain *mental states.* One's " self " becomes a logical construction out of these latter standing in certain relations to each other. Russell expresses substantially the same view in his latest pronouncement on the question before 1921, viz., " The Ultimate Constituents of Matter " (1915).

One may summarize the final position on this topic before 1921 roughly as follows. The ultimate particulars for the logical construction of the *material* world are *sensibilia.* These are short-lived, extended events. When a person is having a *sensation* he is being acquainted with a certain sensibile, and is aware by acquaintance of certain of the latter's qualities (e.g., its sensible blueness, roundness, etc.) and of certain of its relations (e.g., its being to the right of a certain other sensibile in his visual field at

the time.) When a person is thus being acquainted with a certain sensibile the latter is said to be a *sense-datum* for him. There is no reason to doubt that there are other particulars, of the same general nature as those which from time to time become sense-data to a person who is having a sensation, which never become sense-data. These may be called " unsensed sensibilia ". Sensibilia (some sensed, and the vast majority unsensed) are the ultimate particulars in terms of which all logical constructions of statements about " matter " must be made.

Now any sensation involves, beside the sensibile which is its immediate object (i.e., its sense-datum), an act or state of *sensing* (i.e., one of being acquainted). This is essentially *mental.* One is acquainted from time to time not only with this or that sensibile, when one has such and such a sensation. One is also acquainted from time to time, by introspection, with this or that occurrence (e.g., a sensation of one's own) which is, or which involves, a certain mental act or state (e.g., one of sensing). For any statement containing such words as " mind " one should substitute appropriate sets of statements which do not contain any such word, but which do contain names of various mental acts or states, such as one is from time to time acquainted with by introspection.

The essential change in Russell's position which appears for the first time in his "Analysis of Mind " is this. He drops the analysis of sensation into *act of sensing* (mental) and *sensed object* (non-mental), on the ground that the former can neither be observed nor legitimately inferred from anything that can be observed. He now recognizes only one ultimate kind of particular, viz., short-lived events of the kind which he formerly called " sensibilia ". These are in themselves neither material nor mental; but they are the common stuff out of which are logically constructed both what we call " minds " and/or " mental events " and what we call " material things " and/or " physical events ". There are at least two fundamentally different kinds of ordered sets of such neutral particulars. One kind is ordered in accordance with laws of a *physical* sort, and the other kind in accordance with laws of a *psychological* sort.

As regards any one of the ultimate particulars there are the following three possibilities. (*a*) It may be *at once* a member of two sets, one ordered in accordance with physical laws and the other in accordance with psychological ones. In that case it will count as so-and-so's perception of such and such a material thing or physical event; and it will also count as such and such a state of so-and-so's brain, viz., as that one which physiologists would regard as the brain-state immediately correlated with that perception. (*b*) It may be a member *only* of a set ordered in accordance with *physical* laws. In that case it will count as an element in such and such an *unperceived* material thing or physical process. (*c*) It may be a member *only* of a set ordered in accordance with *psychological* laws. In that case it will count as a *purely mental* occurence. (In his "Analysis of Mind " Russell regards what we call " mental images ", whether arising spontaneously or called up deliberately, as instances of this third possibility.)

It is plain that at this stage the dualism which Russell formerly held to exist between two kinds of *particular*, viz., mental and non-mental, has been dropped. It has been replaced by a dualism between two kinds of *law*, viz., psychological and physical. There is no need here to elaborate the notion of physical laws; but something must be said about what Russell at this stage took to be the peculiarity of a psychological law.

At the time when he wrote his "Analysis of Mind" Russell had been much impressed with the notion of "mnemic causation". This he derived from two works by Semon, "*Die Mneme*" (1904) and "*Die mnemischen Empfindungen*" (1909). The idea of mnemic causation is this. There are plenty of instances in which there is a finite interval of time between a certain earlier event (e.g., meeting a certain person) and a certain later event (e.g., having an experience of remembering the incident), where the earlier event is certainly a necessary causal condition of the later one. Now it is commonly assumed that in all such cases the earlier event initiates a sequence of events, each of which is an effect of its immediate predecessor and a cause-factor in producing its immediate successor; that this sequence occupies the temporal gap between the earlier event and the later one; and that the later one is *immediately* caused by that one in this sequence which *immediately* precedes it. The essential feature in the doctrine of mnemic causation is to hold that there are cases in which the above common assumption is *false*. According to it, an earlier event may be an essential causal condition of a remotely later one *without* there being any such sequence of intermediate events as is commonly assumed to fill the temporal gap between the two. In such cases, where an essential factor in the *immediate* cause of an event is something that happened *at a finite period before* the latter began, we have mnemic causation.

Now, according to Russell in 1921, a "mental image" may or may not have mnemic causes, but it always has mnemic effects. A sensation, on the other hand, has only physical causes, though it may have mnemic effects. This theory of mnemic causation is, I believe, peculiar to the "Analysis of Mind" among Russell's writings. It is certainly quite definitely given up in "Human Knowledge, its Scope and Relations" (1948).

It remains to mention one other characteristic feature of "Analysis of Mind". Russell had been reading carefully the writings of the American behaviourists, who claimed to get rid of everything that semed *prima facie* to be specifically mental. With much of the programme of this school he found himself highly sympathetic. But they were not, and did not pretend to be, philosophers; whilst Russell was steeped in the problems of philosophy, had wrestled with many of them, and had offered various solutions to some. So a good deal of "Analysis of Mind" may fairly be described as a strenuous attempt by a supremely able and well-informed philosopher to get as near to behaviourism as his philosophic conscience would allow. This tendency, like the neutral monism and unlike the mnemic causation, remained henceforth a permanent feature in Russell's philosophy.

I pass next to Russell's "Analysis of Matter", published in 1927. This work falls into three interconnected parts, which are concerned respectively with the following questions: (1) What is the logical structure of theoretical physics, considered simply as a hypothetical-deductive system? (2) How are the terms (e.g., atoms, electrons, electro-magnetic waves, etc.) and the laws (e.g. Maxwell's equations) of physics connected with the data of sense-perception, which must constitute the ultimate evidence for them? (3) What is the most plausible view of the contents and the structure of nature which shall be compatible with the answers given to the logical questions under (1) and to the epistemological questions under (2)?

Here we are concerned mainly with the questions discussed in Part II. The principal points which emerge are these:

(i) The commonsense view of an ordinary grown person is roughly this. The world consists of more or less permanent bodies, each of which combines many different qualities and passes through a sequence of various states. All these things exist in a common space; they interact with each other; and their changes have dates and durations in a common time.

Now this view, though practically universal, is by no means primitive. We can see infants painfully acquiring it by practice in their tender years. Russell suggests that the acquirement of conditioned reflexes in infancy is the physiological analogue of the use by a grown person of inductive arguments, and he holds that it plays an essential part in building up the common-sense grown-up view of the world.

(ii) If we take "inference" in a wide sense, to cover the acquirement of conditioned reflexes before the use of speech and reasoning, it is difficult to point to anything that is a pure datum unmodified by inference. But we can still arrange various kinds of judgment in a hierarchy in this respect. We can see, e.g., that "This is a sensibly red occurrence" involves much less inference than "This is a red material thing". So the problem is to show how judgments involving more "inference" are based upon ones involving less.

(iii) Russell holds that the essential change in passing from the common-sense view of perception to the view of it taken by physical science is this. One abandons naive realism and adopts a *causal* theory.

The causal theory of perception has two sides to it, one negative and the other positive. The negative side is that what each of us is acquainted with in sense-perception is always something *private to himself.* Russell does not here trouble to consider the arguments for this. The positive side has the following two main features: (*a*) That various percepts of one's own which are correlated in certain ways with each other, and various correlated percepts of different persons, are all due to a common remote cause. (Examples would be those percepts which are taken as so many different visual appearances to oneself of one and the same thing from various points of view; and those percepts which are taken as visual appearances of the same thing to different persons.) (*b*) That some of the properties of such a remote cause can be inferred from the nature and inter-relations of such a set of correlated percepts.

(iv) The main conclusions which Russell reaches as to the positive side of the causal theory may be summarized as follows:

(*a*) It cannot be demonstrated. But, if we accept the validity of induction and of inverse hypothetical reasoning, it can be shown to be highly probable.

(*b*) The course of the argument would be roughly as follows:

(α) Each percipient can supplement the percepts which he actually has by other correlated ones which *he would have had if* he had followed up his actual percepts by a certain series of sensations of movement. This is an induction from cases in which such series were actually experienced and such and such correlated percepts actually followed.

(β) The next step is from the existence of *one's own* actual and possible percepts to that of others which are *not* one's own. It is at this stage that each of us constructs the notion of a space common to many percipients. Russell thinks that the argument, if set out, is one by analogy, and that it is very strong.

(γ) The last step is from the actual and possible percepts of oneself and of others to events which happen where and when there is *no actual percipient* (e.g., an explosion miles beneath the earth's surface, or a rain-storm before any men or animals existed); or which are such that no actual percipient *could* perceive them (e.g., an electromagnetic wave, an atom, etc.)

(*c*) Granted that we can legitimately infer to events which are not, and which perhaps from their nature could not, be perceived by anyone, how much can we know about the character of such events? Russell holds that we can infer with high probability from the *structural* features of our correlated percepts a good deal as to the *structural* features of unperceived and even of imperceptible events. But he holds that we can infer little or nothing from the *qualities* of the former to the *qualitative* character of the latter.

I think that we may fairly summarize the main content of " The Philosophy of Matter " as follows. It is a very thorough attempt to carry out in detail a view of sense-perception and of the physical world such as was adumbrated by John Stuart Mill in his theory of material things as " permanent possibilities of sensation ".

Of Russell's two later philosophical works, "An Enquiry into Truth and Meaning " (1940) and " Human Knowledge, its Scope and Relations " (1948), I shall consider only the latter, and only a part of that. Of the six Sections into which the latter work is divided, those on " Language " (Sect. II), on " Science and Perception " (Sect. III), and on " Scientific Concepts " (Sect. IV) cover much the same ground as does the former book. Russell's conclusions are essentially the same, though there is an increase of caution as to what we can reasonably conjecture about the detailed nature of the entities postulated by mathematical physics. Sect. V is concerned with Probability. All five lead up to Sect. VI, entitled " The Postulates of Scientific Inference ". It is with this that I shall be mainly concerned, but I will first say something about Russell's views on Probability.

Probability, as discussed by pure mathematicians, is characterized by a set of axioms, from which theorems can be deduced. These axioms admit of various interpretations, and the pure mathematician is not concerned with these. The practical importance of the axioms is that we can give such interpretations to them as will bring the degree of probability of a statement into correlation with its degree of *credibility*. The notion of " credibility " is a different one from that of " probability ", however the axioms may be interpreted; and there are kinds of statement which have a high degree of *credibility*, but to which the notion of *mathematical probability* (however interpreted) does not apply.

Russell's own interpretation of mathematical probability may be called the " Finite Frequency Interpretation ". According to it, the probability of an A being a B is the ratio of the number of things which are both A and B to the number of those which are A. Now Russell holds that the notion of such a ratio is meaningless except on the assumption that the number of things which are A is *finite*. He therefore explicitly rejects the kind of *limiting* class-frequency interpretation which has been proposed by von Mises and by Reichenbach.

This brings us to Russell's conclusions about the logical status of *Induction*. They many be summarized as follows. No reasoning in terms of probability can validate the use of inductive argument *in general*. But such reasoning may raise the probability of a *particular inductive generalization* (e.g., All crows are black), if and only if the latter already has some finite initial " probability ", in the sense of credibility. Now we cannot assign such an initial degree of credibility to any generalization unless we assume one or more general postulates as to the nature and structure of the external world. (So far Russell's position is essentially similar to that of J. M. Keynes in the latter's " Treatise on Probability ". Keynes' suggested postulate is that of " Limited Variety ".) Such postulates cannot, without logical circularity, be shown to be certain or even probable by any argument from experience.

The above forms the natural preliminary to Section VI, which is entitled " The Postulates of Scientific Inference ", and this is probably the most important part of the book.

Russell gives five Postulates about the " make-up " of the world, which he considers to be tacitly presupposed, though not usually explicitly formulated, in scientific research and in the construction of scientific theories.

The first of these is a form of the assumption that the world is composed of various more or less *permanent* " things ", with varying states and varying mutual relations. The second is a form of the following assumption. The causes of a given event are confined to a certain *limited part* of the total state of affairs immediately preceding it; and similarly its effects are confined to a certain limited part of the total state of affairs which will immediately follow it. The third postulate is essentially the denial of *actio in distans*. (Amusingly enough, it involves the denial of " mnemic causation ", which would be a kind of *actio in distans* in *time*.) It may be put as follows. If there is a spatial gap, or a temporal gap, or both, between two events which are

causally connected with each other, then that gap must be filled by a causal chain of events forming a series of spatially and temporally *contiguous links*, starting from the earlier and ending with the later of the two.

The fourth postulate is considerably more specific than any of the first three. It may be stated as follows. Suppose that a number of complex events, all of which are alike in structure, occur in various regions which all lie in various directions from a common centre. Then it is to be assumed that there is at this centre an event of the same structure, and that each of these structurally similar events is on a different causal line emanating from this common central event. (E.g., the various events in question might be so many heard bangs, each sensed by a different person at a different place and time. And the central event might be the discharge of a gun at a certain place at a certain earlier date.)

The fifth and last of these postulates is called by Russell that of "Analogy". It may be formulated as follows. Consider events of two kinds, say A-events and B-events. Suppose that, when *both* a certain A-event and a certain B-event can be observed, there is reason to believe that the former is an essential factor in causing the latter. A case may arise in which one observes an A-event, but where the circumstances are such that one would *not* be able to observe a B-event even if one were to follow. Then it is assumed to be highly probable that a B-event *will in fact* follow. (Similarly, if one observes a B-event under circumstances in which one could *not* have observed an A-event even if one had preceded, it is assumed to be highly probable that an A-event *actually did* precede.)

It is to acting in accordance with the fifth postulate that Russell ascribes *inter alia* the belief which each of us acquires in the existence of other conscious beings more or less like himself.

Russell appears to hold that the higher non-human animals and human infants have innate dispositions to behave in accordance with each of these five postulates. He says that the formation of inferential habits which lead to expectations which are in the main true is part of that adaption of a creature to its environment on which biological survival depends. But *deliberate* thinking and action, which is in fact in accordance with these postulates, can occur only in mature and suitably trained human beings. And *recognition* that thinking and action are taking place in accordance with such and such postulates can occur only in the course of philosophic reflexion on the nature of scientific practice and theory.

"Human Knowledge, its Scope and Relations" had a respectful but relatively tepid reception by contemporary philosophers. Philosophic fashion in England at that time was mainly centred on what was called "Logical Positivism". The problems treated in the book, and the solutions proposed for them, lay outside this then fashionable area; and the interests and energies of most of those who could have understood it and have made intelligent criticisms on it were directed elsewhere.

In the above account of Russell's philosophy I have traced the gradual change in his opinions from what might be termed Platonic realism to naturalism and

empiricism, and I have pointed out various specially marked stages in this. It would not be fair to end without mentioning certain qualifications which Russell has himself explicitly made. I can best do this by referring to certain remarks which he makes in the volume " The Philosophy of Bertrand Russell " (1944). I think that he would have been inclined to repeat them up to the end of his life; and I conclude by quoting some of them.

(1) " . . . even after I had abandoned Hegel, the eternal Platonic world gave me something non-human to admire. I thought of mathematics with reverence, and suffered when Wittgenstein led me to regard it as nothing but tautologies " (P. 19).

(2) " I have always ardently desired to find some justifications for the emotions inspired by certain things that seemed to stand outside human life and to deserve feelings of awe . . . Those who attempt to make a religion of humanism, which recognizes nothing greater than man, do not satisfy my emotions. And yet I am unable to believe that, in the world as known, there is anything that I can value outside human beings and to a much less extent animals . . . " (Pp. 19–20).

(3) " . . . Suppose, for example, that someone was to advocate the introduction of bullfighting into this country. In opposing the proposal I should *feel*, not only that I was expressing my desires, but that my desires in the matter are *right*, whatever that may mean. As a matter of argument I can, I think, show that I am not guilty of any logical inconsistency in holding to " (a purely emotive) " interpretation of ethics and at the same time expressing strong ethical preferences. But in feeling, I am not satisfied. I can only say that, while my own opinion as to ethics does not satisfy me, other people's satisfy me still less " (P. 724).

(4) " . . . What makes my attitude towards religion complex is that, although I consider some form of personal religion highly desirable, and find many people unsatisfactory through the lack of it, I cannot accept the theology of any well known religion, and I incline to think that most churches at most times have done more harm than good " (P. 726).