PHILOSOPHY AND ABSTRACTIONS

by

GWENYTH H. BONE.

Thesis presented for the Degree of
Doctor of Philosophy.
University of Edinburgh, May, 1954.
# CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td><strong>SECTION I</strong></td>
<td><strong>SOME DISTINCTIVE TYPES OF ABSTRACTION</strong></td>
<td></td>
</tr>
<tr>
<td>Chapter I</td>
<td>The Abstractions of Specialised Studies.</td>
<td>1</td>
</tr>
<tr>
<td>Chapter II</td>
<td>Logic and Specialisation within Philosophy.</td>
<td>29</td>
</tr>
<tr>
<td>Chapter III</td>
<td>The Abstractions of Systematic Philosophy. (I)</td>
<td>55</td>
</tr>
<tr>
<td>Chapter IV</td>
<td>The Abstractions of Systematic Philosophy. (II)</td>
<td>79</td>
</tr>
<tr>
<td><strong>SECTION II</strong></td>
<td><strong>THE RATIONALIST ABSTRACTION IN THE SEVENTEENTH CENTURY.</strong></td>
<td></td>
</tr>
<tr>
<td>Chapter V</td>
<td>&quot;Ways of Knowing&quot; in Science and Philosophy.</td>
<td>108</td>
</tr>
<tr>
<td>Chapter VI</td>
<td>Natural Law and Seventeenth Century Political Theory.</td>
<td>141</td>
</tr>
</tbody>
</table>
Contents (ii)

SECTION III

SOME INADVERTENT CRITICISMS OF RATIONALISM IN SEVENTEENTH CENTURY PHILOSOPHY.

Chapter VII Mathematical Method and Metaphysics – The Cartesian "Experiment". 185
Chapter VIII Some Self-evidenced Limitations of Descartes' Method. 209
Chapter IX Alternative Interpretations of Mathematical Method. 231
Chapter X Beyond Mathematical Analogies. 253

Conclusion. 290
PHILOSOPHY AND ABSTRACTIONS

INTRODUCTION.

"You cannot think without abstractions; accordingly it is of the utmost importance to be vigilant in critically revising your modes of abstraction. It is here that philosophy finds its niche as essential to the healthy progress of society. It is the critic of abstractions." (Whitehead.)

Criticism, it is agreed by many contemporary philosophers, is the chief function of philosophy. The widest bearing of philosophy upon the abstractions of special modes of thought and practice is, however, frequently veiled by an unwarrantedly rigid distinction between two kinds of philosophy. The legitimate and valuable activity of philosophical criticism is contrasted with a vaguer and less respectable enterprise, speculative metaphysics. But this contrast is based upon too narrow a conception of each. No such rigid distinction can, in practice, be drawn between them — nor, in the works of the greatest philosophers have they been so sundered (except by their commentators). Criticism cannot be performed in vacuo, but requires, even
even in its narrowest sense, to be based upon some metaphysical viewpoint. Metaphysics, on the other hand, not only presupposes critical philosophy, but can in its own way serve a significant critical function.

The task of critical philosophy, as traditionally distinguished from metaphysics, consists in the direct analysis of the concepts and assumptions employed in everyday life and science. Whereas particular sciences use, for example, notions of substance and cause, they do not for their special purposes examine precisely what is involved in the employment of these terms. Similarly, each science works on the basis of unproved and unexamined assumptions. Some of these may have been borrowed from another science wherein they were examined, but as more generally employed outside that limited context, are simply assumed. Others involve strictly philosophical considerations. All sciences assume, for instance, that in sense perception we are in contact with a "reality" external to the perceiver, which is a more or less stable and independent system of entities universally perceivable in like manner, and unaltered by the mere fact of the awareness itself. Although such an assumption may well be correct, it must be examined by philosophy and related to others. When this is done, fundamental difficulties may be shown in fact to attach to the philosophical presuppositions embedded in the acceptance
of such views at an uncritical level. The Newtonian conception of the perceivable universe, for instance, although of certain practical usefulness, if accepted as final creates many difficulties in respect of its combination into a consistent whole with the rest of experience. Thus Berkeley and Hume raised the question of how a world consisting of externally-related "bodies" in an independent existing space, subject to external changes in time (also "absolute", i.e. independently "flowing") could be perceived or known. Their criticism of the possibility of such knowledge within these terms suggested the need to modify the Newtonian world picture in important respects, despite the fact that it was one which seemed to recommend itself both to the science of that epoch and to common sense as a reasonable account of what is involved in perception. In short, the use of concepts and assumption of beliefs within science and common sense is justified pragmatically: the function of critical philosophy, on the other hand, is to analyse these concepts, and to elucidate and criticise such beliefs. For philosophy is concerned with what departmentalists leave uncriticised.

* This extremely summary statement of the function of "critical philosophy" is made simply to introduce the distinctive way (that is, in the wider and less direct sense) in which philosophical criticism is to be treated in the remainder of this thesis.
The analysis of terms and articulation of assumptions, however, cannot be undertaken independently of metaphysics. Like the destructive criticism of other philosophies, it necessarily involves a constructive philosophy. True to their frequently "sceptical" character, critical philosophers have generally declined to state this. That the duty of examining or stating their own principles ought not to be neglected is, indeed, admitted by some, but is frequently omitted. A refusal to state and discuss such "fundamentals", however, must inevitably conceal a covert dogmatism, since, as Bradley and many others have pointed out, it is impossible to contest a statement about the nature of reality, or to hold something to be impossible, without holding some positive theory as to the nature of reality and possibility.

Moreover, the close relation between the synopsis

* Cf. for example, Stebbing, "The Method of Analysis in Metaphysics." "Just as every conception of the nature of metaphysical problems rests upon certain dogmatic assumptions, so the use of a given metaphysical method rests upon certain presuppositions. It does not, however, follow that those who use a certain method have paused to ask what are the presuppositions upon which its successful employment rests: still less whether these presuppositions could be justified. The philosophers (Moore, Russell, Broad, Wittgenstein) who have used this method of analysis have not, I think, seen fit to raise these questions, which seem to me important to ask and difficult to answer."

characteristic of metaphysical philosophy, and the analysis performed by the strictly critical, is shown in the fact that it is generally synopsis which gives the stimulus to analysis. For sets of concepts and principles, which seem internally consistent and satisfactory when the several regions of facts to which they pertain are contemplated separately, may be found to conflict with one another when these departments are related. In such a case, synopsis affords an important motive for further analysis of the concepts in question, in order to see whether the inconsistency is fundamental, or can be avoided by further clarification.

These are some of the more immediate senses, then in which the critical and metaphysical philosophy of the traditional distinction are necessarily interrelated. To observe these, however, is not in itself sufficient. The critical function of philosophy must itself be more broadly conceived, to include also that performed by explicit metaphysical thinking. There is, as Price reminds us,* such a thing as "synoptic clarity". This is the aspect with which, in the context of the citation from Whitehead, we are here primarily concerned. In order to avoid ambiguity, however, its consideration must be preceded by a summary definition of the limited sense in which metaphysics is to be understood for the immediate purposes of this discussion.

The terms "metaphysics" or "speculative philosophy" as employed in the above-mentioned distinction, cover two further distinguishable (although not necessarily distinct) activities of constructive philosophy: speculation, and synoptic thinking. "Speculative" may perhaps, broadly speaking, be used to characterise those philosophers who, without necessarily constructing an all-embracing system, have referred to certain orders of "being" transcending experience itself, in order to give a rational explanation of the nature of empirical reality. Plato's Divine Craftsman in the Timaeus, for example, or his theory of forms, are postulated in order to account for the intelligible structure of the world on the one hand, and for the validity of ethical and aesthetic judgements on the other. Similarly, Aristotle introduces the idea of a First Unmoved Mover to account for motion; Bergson, and "vitalist" philosophers, the idea of an élan vital, a special creative power within things, to explain the processes of development and organisation characteristic of living things.

"Synoptic" thinking, on the other hand, need not (although it may, and when completed by "synthesis", usually does) include the postulation of such metaphysical entities. Its main function is co-ordination, and through this, interpretation. To this end philosophers may suggest and elaborate some theoretical stand-point from which to view and to
connect the various facts of experience, and to overcome the
disparateness of their presentation, so enabling each to lend
significance and perspective to the others. This is the
essential preliminary to "synthesis" - the attempt to state the principles of utmost generality underlying events. *

Just as metaphysics was seen to be involved in critical philosophy (of the narrower interpretation) so the latter must, however, be employed within the speculative and synoptic thinking of metaphysicians. Unfortunately, whilst rightly drawing attention to the need to understand and connect the diverse factors within experience, metaphysicians of both types have, in the past, often tended to overlook this, ** and to overstate their case.

* Although at this point of completion, synoptic thinking may inevitably pass over into the order of "speculation" mentioned above, we are in the chapters following proposing to concentrate rather upon the stage of synoptic interpretation by means of co-ordinating notions within metaphysics, than upon more far-reaching claims to disclose in some sense "the ultimate nature of Reality". This limitation of the conception of metaphysics, by no means implies an exhaustive definition of the subject (admittedly excluding much of what has traditionally formed the most important parts of it) but is necessary in order to keep the discussion within manageable proportions, and at the same time to indicate that, however important may be the "criticism of abstractions", it is not put forward as the sole function of metaphysical philosophy generally.

** As Kant wrote in the Introduction to the Critique of Pure Reason, "It is, indeed, the common fate of human reason to complete its speculative structures as speedily as may be, and only afterwards to inquire whether the foundations are reliable." The reliable foundations clearly depend, inter alia, upon critical analysis of the data.
Linguistic philosophers can justifiably point to the language of speculative philosophers as one of the sources of their own problems. For language, having been constructed in practical situations and in connection with physical phenomena, is inevitably a very clumsy vehicle for conveying the ideas involved. Certainly it is not logically possible to account for causation in general in terms of empirically discovered particular causal relations, or to justify moral evaluation by reference to empirical facts. (Similarly the philosopher of religion, for instance, is faced with the problem of how to elucidate beliefs such as immortality or "eternal life" in strictly temporal terminology, without introducing misleading "imagery".) But it is equally difficult, by the nature of language, to make clear what exactly is being asserted in such "metaphysical explanations". The too literal interpretation of metaphysical postulates, or their assimilation to pseudo-scientific hypotheses (whilst excluding the possibility of scientific verification of them) has engendered the disrepute of such thinking altogether.

Similarly, synoptic co-ordination has too often appeared as the construction of a deductive speculative system upon the narrow basis of some isolated or selected feature of reality. The result of such a procedure is clearly bias rather than impartiality, dogmatism than open-minded
desire to understand in one's approach to experience. The value of metaphysical theories of this order (or emphasis) has, moreover, been likewise veiled by illegitimate questions regarding their truth or falsity, rather than their adequacy or inadequacy.

One of the factors responsible for such errors, and for the consequent doubt cast upon metaphysics generally has been the failure on the part of these philosophers to presuppose and include throughout the critical philosophy. Consequently their "intuitions" have too often been "blind" as well as their concepts "empty". For to take over masses of uncriticised detail from the sciences, and from the ethical and religious experiences of men, without clarifying them by critical philosophy is useless. It is not surprising, then, that such philosophy has seemed only to consist of more or less "happy guesses made on a very slender basis" (Broad), about which its theorists have been infamously dogmatic.

It is, however, an exaggeration to depict all metaphysics (whether predominantly speculative or simply synoptic) as endeavouring to prove a preconceived system, by which inconvenient data are slurred over, or explained away. Philosophical reflection, of whichever emphasis, stems from the rational desire to understand the world by finding an intelligible pattern in events. If it be appreciated that
by "the world" is not, however, necessarily implied something finished and completed at any given moment, and that, correlatively, any propositional expression of the understanding achieved must eschew dogmatic claims for finality and completeness, then such a quest represents not the philosophical arrogance it is sometimes believed, but a vital factor in human progress. Two prominent instances may be selected in support of this contention. Both are taken from science, but the second opens up the wider point to be illustrated in the historical part (Sections II and III) of this thesis, and bases itself upon that afore-mentioned aspect of philosophical criticism performed by metaphysical thinking rather than by the direct analysis contributed by critical philosophy in the strict sense.

In the first place, philosophical speculations do not simply "close down" avenues of potential scientific discovery by their a priori "armchair deductions", but, in point of fact, open them up. The practical discoveries of empirical science are always preceded by abstract theories, scientific methods by philosophic intuitions which give the initial impulse to scientific research and discovery. The special sciences, as Whitehead reminds us, "require that the imaginations of men be stored with imaginative possibilities as yet unutilized in the service of scientific explanation."

"The nearest analogy is to be seen in the history of
some species of animal, or plant, or microbe, which lurks for ages as an obscure by-product of nature in some lonely jungle, or morass, or island. Then by some trick of circumstance it escapes into the outer world and transforms a civilization, or destroys an empire, or the forests of a continent. Such is the potential power of the ideas which live in the various systems of philosophy." *

(Adventures of Ideas. p. 193.)

The reaction between science and philosophy, the mutual criticism and provision of imaginative material the one for the other of which Whitehead speaks in general terms, has been more precisely supported and illustrated by such scientists as are willing to make incursions into philosophy. A notable modern example is, of course, Eddington, who emphasises the essential overlap of physics and philosophy, particularly in the field of epistemology. He writes,

"For developing the modern theories of matter and radiation a definite epistemological outlook has become a necessity; and it is the direct source of the most far-reaching scientific advances. We have discovered that it is actually an aid in the search for knowledge to understand the nature of the knowledge which we seek. . . . If our epistemology is at fault, it will lead to an impasse in the scientific developments proceeding from it; that warns us that our philosophical insight has not been deep enough, and we must cast about to find what has been overlooked. In this way scientific advances which result from epistemological insight have in turn educated our

* Cf. also the concluding paragraph of the introduction to his own major speculative work. "Philosophy is the welding of imagination and common sense into a restraint upon specialists, and also into an enlargement of their imaginations. By providing the generic notions, philosophy should make it easier to conceive the infinite variety of specific instances which rest unrealised in the womb of Nature."

epistemological insight. Between science and scientific epistemology there has been a give and take by which both have greatly benefited."
(The Philosophy of Physical Science. p. 6.)

The Kantian bias of the above-quoted writer leads him to emphasise the influence of contemporary epistemology on scientific advance, but it is noteworthy that philosophical systems in a wider sense may well afford a type of synthesis which becomes of scientific significance only at a much later date, when the advance of the technical aspects of science itself makes its precise formulation possible and directly illuminating. A prominent example of this * can be taken from Spinoza. The theory of bodies to be found in Book II of the Ethics is constructed in consistency with his general principle that there are no finite continuants, and that the only genuine continuant is God (a substance at once material and mental). In the 19th century, Kelvin stated and worked out in detail an atomic theory on precisely the lines indicated more vaguely by Spinoza's metaphysics. It is pointed out (op. cit.) that one may equate Spinoza's "God considered under the Attribute of Extension" with Kelvin's ether, and Spinoza's corpora simplicissima with Kelvin's vortex-atoms, and thus perceive Spinoza's suggestion to be intelligible and illuminating in respect

of at least the material aspect of reality.

Secondly, philosophy affords a certain preventative against scientific dogmatism, by urging its observation "beyond the boundaries of its delusive completeness," and its theories beyond their equally delusive air of finality. Science of itself can rest pragmatically secure in the "half-way houses" of general ideas which suffice for its immediate purposes. Yet to assume that these ideas are ultimate, unanalysable and of universal application without crucial modifications leads to a vicious form of abstraction. The defects of this are apparent even within science itself, since it may, in consequence of such uncritical acceptance of its ideas, combine propositions which, since they tacitly presuppose inconsistent backgrounds, are in direct conflict with one another.

Thus, even from the practical point of view of the special sciences (and their particular disciplines) philosophic aims at comprehensiveness are of direct value. By their means, for instance, intuitions may be cultivated beyond the superficial clarity of detached and unco-ordinated thoughts, and their scope extended beyond any immediate practical requirement. But more important, it is only by co-ordinating the general notions from different fields that their full meaning and potentiality can be appreciated, and the errors of their uncritical transference to other spheres
of application without the necessary modifications, be avoided. The general ideas employed within any specialised study, any systematic topic, require to be elucidated from many different points of view, to be criticised from the standpoint of other subject-matters and methods, as well as to be rendered internally consistent within their indigenous sphere of application. The elucidation of the limitations within which the fundamental intuitions and associated general ideas of single fields of knowledge are inevitably hedged, is a primary task of philosophy.

So far, the critical function of philosophy here described appears to differ very little from the critical philosophy of the traditional opposition (to the "narrowness" of which we took exception) except perhaps in the respect that it has emphasised the synoptic thinking involved, the process of "holding together" the different branches of knowledge which is necessary if the general terms and principles derived therefrom are to receive the required modification and intelligent application within other spheres. The mode of criticism with which we are chiefly concerned, however, is that effected by the systematic development of a single abstraction within metaphysical theories; for rather more attention has generally been paid to the obvious disadvantages than to seeking the possible advantages of the latter within the sphere of criticism itself.
In short, although philosophy has, no less than specialised studies such as the natural sciences, itself frequently been subject to abstraction - as will be illustrated with particular reference to the 17th century - by the systematisation of its abstractions, by their fullest exploitation, it has at the same time given indication of their limitations - has exposed the nature of the "abstraction" upon which it is based - in ways that particular disciplines do not to the same extent afford. Put in other words, we may say that such systematisation of "abstractions", the development of their logical implications and unremitting pursuit of their ramifications outside the more particular "universe of discourse" from which they took rise, represents one form of that pattern of argument which Ryle has claimed to be most proper to philosophy - the reductio ad absurdum; the extraction of contradictions and logical paradoxes from its material, by the means of which the limitations and nature of the initial premises and presuppositions are exposed and clarified. A useful analogy is drawn between this mode of philosophical argument and the "destruction tests" which enable engineers, for instance, to discover the strength of materials.

"Certainly engineers stretch, twist, compress, and batter bits of metal until they collapse, but it is just by such tests that they determine the strains which the metal will withstand. In somewhat the same way, philosophical arguments bring out the logical powers of the ideas under
investigation, by fixing the precise forms of logical mishandling under which they refuse to work."


Philosophical "destruction-tests" may, then, be applied to the use of an idea or method as if it belonged to a certain category and had powers of operation and of fruitful employment identical with an accepted model. It is significantly carried out by a synoptic survey constructed upon the basis of some striking analogy inspiring philosophical reflection upon the universe as a whole, or upon particular problems as they may be illuminated by being brought into closer relation with others. Thus, the co-ordination acquired by a sustained interpretation of different aspects of reality in terms derived from such an abstraction is one of the significant services rendered by a Rationalist philosophy, despite its many attendant errors.

In the discussion following, emphasis will be laid upon the latter (more indirect) mode of criticism contained within systematic philosophy, not only on account of its frequent neglect, but because from the point of view here adopted this constitutes some measure of "justification" of rationalist metaphysics. As such it is of no small value; for even where certain and final solutions to the traditional metaphysical problems are no longer made the goal of philosophic achievement, "critical" problems as to the
possibility of synoptic thinking still remain. It implies, for instance, a wider view of the Reason involved in its pursuit than that of any particular science or methodology, or that usually adopted by critical philosophy with its emphasis upon analysis rather than synthesis. It intimates, in fact, a certain affinity to the Platonic description of the philosopher as one "whose thought can contemplate all time and all existence". But how can this assumption be justified?

The extension of knowledge and learning in all branches since Plato's day clearly makes it impossible to hold unmodified his view of the power of Reason in any single person. No philosopher could now be expected to achieve the synoptic view of all fields which the words suggest in the span of one man's lifetime. Yet the sceptical attitude of many contemporary philosophers to the rationality of any philosophic enterprise beyond that of analysis, the repudiation of all attempts at synthesis, is based upon an equally unquestioning restriction of the conception of Reason with that of their worthy ancestor Hume, when he dramatically denounced as irrational all conclusions of "high-flown metaphysics" and beliefs of common sense practice and of science alike. Taking the reasoning of the successful methodology of his age, mathematical physics, and adopting the current assumption that this alone was knowledge, Hume followed the
lines suggested by Locke, and insisted that the only knowledge of which we can have certain intellectual insight is of "relations between ideas". All other knowledge rests not upon insight, but upon instinctive propensities which as a matter of fact belong to the human species. Such guidance of nature serves us well in practical situations, but we necessarily fall into scepticism if, as philosophers, we try rationally to understand in these spheres.

The problem of justifying the use of Reason in a wider sense, and of defining this sense, is, however, clearly much more difficult than that of pointing to the insufficiency of a conception identified with the mode of reasoning employed in a specialised field of study. The latter insufficiency is in itself shown within the history of philosophy. Kant, for example, no less than Hume, defining Pure Reason on the prototype of mathematical physics, saw that it could give knowledge only of relations between phenomena and was, consequently, tied to sense experience. Believing, however, that our apprehension of reality is not confined to the limited comprehension of which such reason is capable, he turned to Practical Reason to avert the tide of scepticism with which Hume had awakened philosophy from its "dogmatic slumber". But, as Bergson (attempting a rapprochement of science and philosophy) rightly protested,

"Kant has criticised not reason in general, but reason
fashioned to the habits and exigencies of the Cartesian mechanism or Newtonian Physics . . . Let us ask whether our metaphysic cannot be reconciled with science because it lags behind science, being the metaphysic of a rigid science with mechanical categories . . . while science of the 19th century seems to have aspired to a much more subtle form and not always taken mathematics as its model."
(Cited by Lindsay. The Philosophy of Bergson. p. 10.)

Not until the universe has received systematic interpretation in terms of a Cartesian mechanism or a Newtonian physics, however, does it become clear at which points the limitations of this point of view occur. And a way of "justifying" a more liberal conception of reason than that of such a single methodology is by thus bringing to light these limitations, by exploiting to the full in metaphysical systems the abstractions of their Age to which philosophers are necessarily subject. For in this way the concealed pre-suppositions of thought are made explicit, and to become conscious of one's provincialism (whether in time, place, or subject) is a necessary pre-requisite to the modification of its vicious effects at least, and may even lead ultimately to its removal.

The chapters following are directed neither to the defence of, nor attack upon, metaphysics in general; nor yet do they suggest a possible definition of the "wider" use of Reason evinced within their modes of speculative or synoptic thinking. Their aim is the rather simpler one of elucidating (by means of concrete examples) the quotation from
Whitehead with which this discussion opened, particularly in respect of some forms of metaphysical thinking in which it is possible to perceive the performance of this function, "the criticism of abstractions".

Although the discussion will cover diverse topics and raise many issues which would, in themselves, each require a separate thesis for their adequate treatment, its range and aim may be shortly summarised under three points. First, the term "abstraction" itself must be examined, indicating some different ways in which this occurs within various specialised branches of knowledge, together with the resultant potential dangers which render this function of philosophy so important. Secondly, the position of philosophy in regard to abstractions associated with its own peculiar methods and linguistic forms will be investigated. It is in this connection that reasons will be given for the belief that philosophy stands in a special relation towards its own abstractions, in the sense of providing its own "criticism" as well as that of abstractions created by other subjects and methods. (Section I.) Finally, these first two points will be illustrated historically, by reference to what may be termed the "Rationalist abstraction" in the 17th century. (Sections II and III.)

The nature of the latter is more precisely examined, particular attention being paid to its bearing upon the
I.e. all three may be said to have taken the methods and content of Euclid as a model in one way or another, and it is in this sense that the term "mathematical" is applied to the ideas and methods of all three of the philosophers considered. The different interpretations of this model will be specified in the course of discussion (cf. p. 186 and p. 231).
epistemology and categories of intelligibility which gained widespread acceptance within that and subsequent centuries, and its connection with the scientific revolution which afforded its immediate inspiration. This somewhat "general" consideration of those features of Rationalism most relevant to the present purpose, introduces a more specific illustration of the effects of an analogical extension of categories and methods from one specialised field of study to another where the subject matter is of quite a different nature. The example taken is that of political theory in the 17th century, considering some effects of methods and terminology drawn primarily from the natural sciences upon the traditional theories of Natural Law and Social Contract, and their contribution to the breakdown of the latter theories.

The historical part of the thesis concludes with reference to three particular philosophers whose initial inspiration from mathematics and the mathematical science of the 17th century at least, earns them the title of Rationalist (as this term is here employed) however divergent in other respects they in fact may be. Examples from Descartes, Spinoza ** and Hobbes are selected to show, by comparison

** The inclusion of Spinoza in this triad may be questioned on the grounds that he did not attempt, in the manner of Descartes and Hobbes, to work out the implications of
of the different forms taken by this same basic pattern of thought, the way in which a philosopher may, by the systematisation of such an abstraction, bring more clearly to light those deriving from methods and terminology of the specialism dominant in that epoch and influencing (albeit unnoticed) the theory and practice of his contemporaries and of subsequent generations. Similarly, they afford evidence of that "self-criticism" to be found both within the work of a single philosopher, and within the history of philosophy. The term "criticism" is in both cases extended to cover, on the one hand, the indirect exposure of the boundaries circumscribing the legitimate use of particular methods and categories of thought, which is brought about by their consistent transgression, and on the other, the mutual correction afforded by alternative emphases and "transgressions" which make their appearance in the history of mathematical conceptions into a thoroughly mechanistic picture of the universe, but radically objected to such a mechanical view of things. The interpretations of Spinoza which emphasise this protest are, I believe, nearer to the true meaning of his philosophy than those which find in him but the rigorous application of the categories and methods of 17th century science. Nevertheless, Spinoza's metaphysics provides an illuminating instance of the "criticism of abstractions" here discussed, in respect of the deficiencies of preceding mathematical philosophies - recognised and portrayed, for instance, in the stage of Ratio, and supplemented in the highest stage of knowledge which is Scientia intuitiva - and also in virtue of the fact that he corrects the Cartesian interpretation of mathematical reasoning, the linear inference which professed to be the paradigm of Descartes' metaphysical exposition.
of philosophy.

The use of the term "criticism" in this connection may perhaps be challenged as a travesty of the usual, directly conscious examination of concepts within that activity known as critical philosophy. But restriction of the term to the latter enterprise must, it has been suggested, itself be questioned if philosophy is indeed in the fullest sense to function as a "critic of abstractions". On these grounds, it is therefore contended that philosophy can, and historically has, provided important experiments in co-ordination, and "explorations" which justify a claim of metaphysical systems to such a critical capacity.

---

within particular disciplines (selecting science and history as our chief examples), two main types of abstraction may be distinguished: the adjectives "horizontal" and "vertical" give some idea of the general characteristics of each respectively.

"Horizontal" abstraction is brought about by the elimination of certain features of a concrete situation, and an
The term "abstraction" is notoriously vague. Its usage in the following discussions must, therefore, be more precisely defined. In particular, it is important to clarify the differences and similarities between the abstractions of particular disciplines, and those specifically of philosophy itself. The distinctions drawn within this chapter and the remainder of the section are intended to do this, although it must be borne in mind that they are somewhat artificial and therefore possibly overlap.

Within particular disciplines (selecting science and history as our chief examples), two main types of abstraction may be distinguished: the adjectives "horizontal" and "vertical" give some idea of the general characteristics of each respectively.

"Horizontal" abstraction is brought about by the omission of certain features of a concrete situation, and an
attenuation of those which seem most significant for the purposes of the enquiry. This occurs principally in the Natural Sciences, whose chief concern and aim is generality. Here the partial omission of qualities is brought about by concentrating upon the measurable features of things - "secondary" qualities being for the scientist's immediate purpose irrelevant. This abstraction takes place in varying manners and degrees within the different branches of Natural Science. *

"Vertical" abstraction, on the other hand, results from the specialisation of a field of knowledge. Progress in the acquisition of detailed knowledge within a particular field of study is accompanied by a certain narrowing of the conception of what is relevant detail. It is the practical illustration of the "professional" sentiment that breadth of outlook creates superficiality.

Both abstractions omit part of the truth in order to facilitate the achievement of a particular end. Neither procedure is inherently vicious, but either may become so when its abstract status is overlooked.

The omission of certain qualities and relationships in

* Cf. for instance J.S. Haldane's examination of the different ways in which physical, biological and psychological Science abstracts.

The Sciences and Philosophy. Gifford Lectures. 1927-8.
the interest of attaining generality, for instance, acts as a direct aid to knowledge by simplifying. Such an abstraction is well-founded when the conclusions drawn from it are not vitiated by the omitted truths. Unfortunately, specialists of any kind tend to elevate their abstraction to the status of the whole, and to invest it even with a superior reality.

The generalisation of a successful method is, in Physics for example, quite legitimate. It is, indeed, prima facie the most rational procedure within any subject-matter exhibiting analogous features. It becomes illegitimate where its application to significantly different phenomena involves ignoring or "explaining away" recalcitrant elements rather than investigating the new methods and categories which their understanding would seem to demand.

In short, the "horizontal" abstraction tends to become vicious when the method by which this attenuation is brought about, or statement of truth achieved in this way, is uncritically asserted outside the context in which it was created and from which it drew its primary significance. The chief peril here lies in the dogmatism as to "patterns of connection" so created. The great attraction resides in the fact that consistency grows with abstraction from the context. For many entities will alternatively produce the same abstract effect.
An example of the problems involved in this type of abstraction is given by Whitehead's reference to the composition of a picture. * This is partly geometrical, and if interest is directed solely to the geometrical relationships, a patch of red can be substituted for a blue. If, on the other hand, we consider the picture more concretely, from the integrated aesthetic point of view, perhaps a masterpiece has been ruined. The red is inconsistent with the concrete effect produced by the blue - in the same geometrical position it destroys its aesthetic value. Yet - and this is the significant point - if logical consistency (derived from concentrating attention upon high abstractions) is all that is looked for, the aesthetic inconsistency will be irrelevant. But again, "... a masterpiece will have been ruined..."

Similarly, the "vertical" abstraction may have unfortunate results in so far as the increased narrowing of his field of study inclines the specialist to ignore what may be relevant from other fields. It is indeed to some extent "a counsel of prudence" that a subject be studied as far as possible in abstraction from the totality of the objects of knowledge: a pre-requisite both of an advance in detailed understanding of a particular field, and of technical expertise. "Effective knowledge is professionalised knowledge."

* Modes of Thought. pp. 81-83.
The progress which is thus afforded is, however, within the "groove" of the particular professional study. If no further attention is paid to the whole from which abstraction is made, such studies create a world of learned minds which, far from being an asset to human society, constitute a grave potential danger. For,

"... there is no groove of abstractions which is adequate for the comprehension of human life. Thus in the modern world, the celibacy of the medieval learned class has been replaced by a celibacy of the intellect which is divorced from the concrete contemplation of the complete facts. Of course, no one is merely a mathematician, or merely a lawyer. People have lives outside their professions or their businesses. But the point is the restraint of serious thought within a groove. The remainder of life is treated superficially, with the imperfect categories of thought derived from one profession."


The same author comments elsewhere, with equal point,

"... to a really learned man, matter exists in test tubes, animals in cages, art in museums, religion in churches, knowledge in libraries ..."

(Essays in *Science and Philosophy*. p. 215.)

The potential dangers of this kind of abstraction are particularly great within democratic societies. If the outlook of their intellectual and political leaders is unbalanced, whilst the specialised functions of the community may be better performed, the general directive is shortsighted. The specialists, caught up by and trained wholly within such a "vertical" abstraction lack the power to coordinate different aspects of experience. Consequently, the treatment of social problems, for example, which essen-
tially require such a power, is frequently muddled or dis-
astrously mistaken. Men oscillate between extremes, as 
some particular set of circumstances is appreciated in de-
tail, and duly emphasised, but never properly co-ordinated 
with others.

These general remarks may be illustrated by means of 
one or two concrete examples, and the limitations and dan-
gers of both types of abstractions so made more apparent.

Scientific explanation is concerned with the general 
laws exemplified within particular situations; it is in-
terested, not in the individuality of events, but in re-
solving their particularity into cases of general laws. 
From this general characteristic derive three significant 
features of scientific method.

First, the formulation of such laws involves the sele-
ction of just those factors, the universal characteris-
tics of behaviour, which enable the scientist most success-
fully to manipulate his data. This point is unaffected by 
different conceptions of actual method, whether, that is, in 
traditional terms of induction, or as primarily a hypo-
thetico-deductive procedure. Secondly, as a corollary * 
to its search for uniformity, the method of the scientist

* For, it is by recourse to a "lower level" of life, or 
to microscopic analysis that it is possible to restore the 
"continuity" and uniformity threatened by phenomena when 
viewed in all their complexity. (See p. 12.)
is necessarily analytic. * Thus, scientific explanation is in accord with the principle that the parts determine the whole. A successful explanation is achieved by exhibiting a complex thing or state as determined by those things or states of which it is composed. Thirdly, the nature and methods of his enquiry make it possible for the scientist to predict, from the observation of past regularities, the probable course of future events.

An uncritical universalisation of scientific procedure and assumptions leads to diverse errors, which vary according to which of these three features is emphasised.

Over-enthusiastic application of the first aspect of Natural Science, and its inherent dangers, may be illustrated by reference to the scientific sociology being developed in this century. ** Only by applying the method of the natural sciences to human problems can men hope to

* The primary part played by analysis is true at least of an important stage in scientific investigation, even if those scientists are right who insist that physics, as well as biology, must take the "whole" into account: viz. Planck, for example, who contends that science has now to surrender a fundamental assumption, namely, "that the course of a process can be represented by means of an analysis of it into its spatial and temporal elements... It is thus the concept of wholeness which must be introduced as well into the field of physics, as into that of biology, in order to enable us to understand and formulate the laws of Nature." M. Planck

** This is not, of course, to suggest that the idea is new - cf. Hobbes, Bentham, Comte, etc. - the more recent manifestations of an old theme being treated for the sake of convenience.
overcome "the contrast between man's amazing ability to manipulate his material environment and his pitiful incompetence in managing his own affairs," writes one such author. *

We are not here concerned with the observation and experiment characteristic of the natural sciences, on the grounds of which this writer and others primarily extol the reasoning of social anthropology and behaviourist psychology. It is rather the scientific pre-occupation with the universal characteristics discernible within the objects of its study which is being examined, and in particular, its limitations as applied to the study of human behaviour - individual or social.

In the first place, it must be remarked that it is needlessly obscurantist to protest against all attempts to construct a scientific psychology and sociology. It may, of course, be doubted whether in fact there is any genuine social science, sociology, anthropology, etc. which is not just social history in detail or in extenso, except those based upon statistical data, e.g. economics, public health - which necessarily exclude the individual in favour of the group. Despite some "looseness", however, in calling them scientific in any exact sense, the former studies have a material contribution to make to the understanding of man and his personal and social problems, in so far as these do

* Wootton. Testament for Social Science. Chapter I.
involve certain universal and repeatable features. To ignore, then, such help as they afford is, apart from anything else, to complicate unnecessarily the business of living and dealing with such problems. The assessment of general tendencies amongst men, as for the rest of the natural world, and their formulation as "general laws", is a "shorthand" without which reflection upon more complicated problems not thus exhausted would itself be practically impossible. Thus, to objections against his endeavour to establish such laws of association levelled on the grounds of the complete intractability of human affairs, the social scientist rightly has a ready reply. The fact of complexity within social situations, of an element of indeterminacy in human behaviour, which may make it difficult to detect underlying uniformities, must not be taken as evidence that no such uniformities exist.

On the other hand, the danger arises when men are considered only in terms of the universal features their behaviour exhibits, and when the ideal of human advancement becomes that of diminishing the individual particularities which make their complete scientific treatment difficult. The reference to "manipulation" in the quotation from Wootton is significant. The physicist can manipulate his data precisely because he has abstracted for consideration just those general factors which enable him to extend his
power and control over nature. But to do the same with men, and to try to "plan" the results of this abstraction into any form required, presents one of the nightmare ideas of an omniscient socialist state as depicted, for example, in Aldous Huxley's *Brave New World*.

Even with such grounds as do exist for equating Rationalism with scientific method - the "universal" being the domain of Reason and the concern of science - it is necessary to bear in mind also that the universal is the product of Reason, and the product of scientific abstraction from data which are being "rationalised". The unique individual, and his unique actions, experiences and relations to others, from which a scientific study of man abstracts, can, therefore, never completely be understood in these terms - can never fully be "rationalised". The inequalities and variety of men in this sense is, indeed, something highly desirable:

"And it appears to be just this irrational realm of unique individuality which makes human relations important. Most people would feel, for example, that what makes their lives worth living would largely be destroyed if they themselves, and their lives, were in no sense unique but in all and every respect typical of a class of people, so that they repeated exactly all the actions and experiences of all other men who belong to this class. It is the uniqueness of our experiences which, in this sense, makes our lives worth living, the unique experience of a landscape, of a sunset, of the expression of a human face."


Sociologists with a determined scientific programme, however, do seem out to destroy or undermine these factors
in human nature. For the latter present obstacles to the
large-scale "planning" of human activity which, on analogy
with scientific "manipulation", is desired within an effi-
cient society. Thus, it is suggested that a most con-
structive line of social research would be regarding the
cause of character differences, since "without their dis-
covery we cannot proceed to their elimination". *

This, it may be objected, is not an inevitable result
of the attempt to construct a wholly scientific sociology.
But it is in fact a logical implication of an exhaustive
application of this aspect of science. It is ultimately
profoundly undemocratic, although democracy in its modern
form was in fact nurtured by scientific ideas (viz. par-
ticularly the influence of Newton and of 17th century criti-
cism of "hierarchies" - cosmological or social). For
regarded as objects of scientific enquiry alone, their be-
haviour formulable in terms of general laws, men are but so
many independent, isolable, similar atoms, not personalities.
It is precisely in virtue of his atomistic analysis that
the physicist is enabled to manipulate, and so obtain a
degree of control over, nature. His method is an instru-
ment of power. The application by sociologists of the
same technique to the solution of social problems implies,
in the last analysis, a distinction between the creative

power of the planner, and the masses of identical individuals (who simply "behave") to be planned. Thus,

"... the man-moulders of the new age will be armed with the powers of an omnicompetent state and an irresistible scientific technique: we shall get at last a race of conditioners who really can cut out all posterity in what shape they please."

(C.S. Lewis. *The Abolition of Man.* p. 43.)

The correlative to this search for uniformity mentioned above – the analytic method of science – is exemplified in some forms of scientific psychology, and "materialist" views of politics (to take just two of the more obvious instances). The faith in microscopic analysis to give all-sufficient explanations of events is, to use Stocks' phrase, a re-affirmation of the "principle of plenitude". It bridges the inexplicable gaps and discontinuities observed in man's fully conscious life, and other events viewed in their complexity, by referring to "lower level" activities for an explanation.

The universal attraction of this "reductive" type of explanation lies in the seeming stability and pervasiveness of the "lower level" features, both in space and time, and the fact that they appear, therefore, to be subject to laws which are easy to formulate and handle mathematically. Whereas features of the "higher levels", on the other hand, seem in contrast to be essentially unstable, and to belong to complex individuals, thereby demanding special rather than merely "routine" conditions for existence.
The universal application of scientific analysis thus results in a form of "materialism" definable as the belief that "the higher structural levels are explicable in terms of the lower". In psychology (where based on scientific analysis) the understanding of the complex man is facilitated by explaining his somewhat spasmodic and intermittent activities in the higher conscious levels wholly in terms of ever present sub-conscious forces and instincts. Similarly, in politics, the method of analysis enables the Marxist historian, for example, to exhibit the large-scale processes of institutional history as resulting from small-scale processes occurring below the level of life as it were - the material means of production.

This uncritical transference of the analytic methods of natural science to those fields wherein its appropriateness at least requires very careful examination and metaphysical justification, * creates a serious confusion of "levels of explanation". It is, moreover, a conspicuous example of an over-hasty generalisation of concepts and methods which within science itself may subsequently require modification. The preference for the "microscopic"

* It is clearly insufficient to base their universalisation upon laudatory proclamations of the "impartiality" of scientific method, for, as Eddington comments, "Notwithstanding its professed principle of treating all points of view impartially, physics does in practice give a preference to the view of the microbe over that of the man."

view is, of course, (as Eddington points out) understandable, in so far as theoretical reasoning seems to pass more easily from small-scale to large-scale results, which in turn leads to the consideration of the latter as implied by the former. But, he adds,

"... there are also signs that this undue insistence upon microscopic analysis may be a passing phase in the physical conception of the external world. It has happened that up to now we have chiefly studied phenomena which are best unravelled by starting with their minutest elements. But in recent years there has come into prominence a large class of phenomena (quantum phenomena) which defy analysis of this kind; and somewhat painfully, physics is accustomed itself to the idea that its microscopic picture of nature is not capable of containing the conceptions which these latest phenomena require."
(The Domain of Science. Op. cit.)

The assumption by analytic, or behaviourist psychologies, for example, of the all-sufficiency of their "levels of explanation" is, then, at least open to question. Lacking more adequate defence than so far given, one may reasonably doubt the ability of any predominantly analytic approach to knowledge to give an exhaustive understanding of man, any more than a sufficient "explanation" of, let us say, a human work of art. Science can explain a statue, for instance, satisfactorily in so far as the explanation can be given in terms of the marble of which it is made. And if it is solely of marble, a complete account can, in a sense, be given in these terms. But it seems to be the form of the completed work which gives it significance as a work of art.
Although, therefore, a scientific account can be given in terms of manual operations and the material medium, something of importance from the artist's point of view is thereby omitted.

A similar inadequacy of explanation, a neglect of certain formative features, is to be found in the above-mentioned "materialist" interpretations of politics. It is undeniable that economic processes are among the most important of the external conditions of political life, and that political and legal institutions cannot be regarded as the products of pure reason, but require to be set in the context of existent economic circumstances. This kind of analysis of the social framework discloses the external, continuous factors behind the more intermittent formative policies produced by rational decisions of individuals and governments. But to try to make it explain the latter completely, is to fall into the above-mentioned confusion of levels. It is no objection against the Marxist conception of history that it neglects all the spiritual achievements of mankind, because they are actually negligible at the level of generality concerned. It is the assumption that this level of explanation affords a complete understanding of human affairs in their concrete occurrence (i.e. before this abstraction has been made) which is questionable.

* Cf. for example, the discussion by MacIver, Historical Explanation. He writes, "Marxist historians can fairly be
Finally, we also find a significant example in Marx of the misleading character of an over-emphasis of the important methodological rôle played by prediction in science. With particular reference to this feature of scientific method, the "scientific history" and "scientific socialism" which he developed illustrate clearly some of the potential dangers of hasty and uncritical employment of the abstractions of science. Three may be suggested here.

First - that of incorrect generalisation due to ignoring the necessary conditions without which there is not a complete analogy between one field and another. Marx seems to suggest that it is in principle possible to make a causal analysis of society, such as will "lay bare the ... law of motion of modern society". This, it is supposed, will reveal the causes of revolutions and so, on analogy with the prediction which the discovery of scientific causes makes possible, enable a historical social science to foresee the future occurrence of similar events. This contention overlooks, however, the fact that scientific prediction as it occurs in physics, for example, and large-scale

criticised for claiming (as they often seem to do) that history cannot legitimately be studied except at their own chosen level, but not for insisting that, at that level, it is only 'materialist' explanations which really explain. This is a simple consequence of the fact that men are more often bad than good, and more often stupid than intelligent so that the acts of the exceptional individuals disappear from view as soon as the human scene is contemplated from any distance." Logic and Language. (II), p.197.
and large-scale historical prophecy concerning the main tendencies of the future development of society are two very different kinds of prediction. That is to say, science, on the basis of recurrences in the past, predicts the probable future happening of similar events. The field of history, on the other hand, embraces phenomena which are not identical in this sense, not repeatable, and thus prediction of specific events is not justified by the nature of the evidence which could be obtained. It does not follow, therefore, that the study of historical "causes" and "effects" justifies such scientific socialism in the prophecy of its own inevitable advent.

It may be remarked that this often seems to be the case, however, because prediction of the behaviour of human beings further differs from the prediction of the behaviour of physical and non-human biological phenomena in that men can consciously make the predictions come true. (The fact that this conscious effort is recognised as necessary by the exhortation to unite and follow the trend of history indicates, of course, its divergence from the "iron necessity" of scientific laws.) But there is a marked difference between the mechanical necessity of a "dialectic" which, like natural "causes" within the physical world, compels capitalists, for example, to behave in predictable ways, and the intelligent reaction of the same capitalists who, on the basis of
expert advice that an existent course of action will produce chaos or revolution, take steps to avoid such consequences. The prediction that Capitalist democracy must lead to unemployment and war; that the United States must attack the U.S.S.R. is not, then, strictly scientific; it is not based solely upon an empirical study of economic trends and tendencies. Rather is it, in short,

"the most startling instance of the way in which the working of an abstract postulational system and a fallacious one at that can lead intelligent people to act in such a way as to try to make its predictions work." (Weldon. The Vocabulary of Politics. p. 131.)

Secondly, Marxist theory also illustrates the danger of elevating to the status of metaphysical dogma a methodological postulate which may, in time be superseded. His emphasis on the pragmatic value of science - upon its predictions - led Marx to conclude that scientific method must be based upon a rigid determinism. Far from determinism being a metaphysical implication of science, however, it seems that as a methodological postulate even, determinism has now been abandoned by science itself. **

---

* Weldon's example.
** "For whatever may be the outcome of such metaphysical controversies as, for example, the bearing of the Quantum theory on 'free-will', one thing, I should say, is settled. No kind of determinism, whether it be expressed as the principle of the uniformity of nature, or as the law of universal causation, can be considered any longer a necessary assumption of scientific method; for physics, the most advanced of all sciences, has shown not only that it can do without such assumptions, but also that to some extent it
Similarly, the nature of his "determinism" proceeds from analogy with the mode of explanation in science which made possible its predictions. That is, the doctrine of economic determinism, or materialist interpretation of history, is fundamentally the assertion that the scientific principle that parts determine the whole is the only legitimate mode of historical explanation. Accordingly, all factors which do not directly fit into the schema this presents are "explained away". Although, on neither count can Marx be blamed for having held a view common amongst the scientists of his day, his dogmatic assertion of it within another field does indicate the dangers of accepting the metaphysical dictates of a particular science (which may in time be abandoned within their own sphere) when the appreciation of its nature as an "abstraction", made within limited contexts and for limited purposes, would surely have led him to avoid any claims of finality for his philosophy.

The third danger, which is connected with the latter error, is that the need for new categories for complete understanding within a fresh subject-matter may be further

contradicts them. Determinism is not a necessary prerequisite of a science which can make predictions. Scientific method cannot, therefore, be said to favour the adoption of strict determinism. Science can be rigidly scientific without this assumption."

concealed by an attempt to "rationalise" events themselves so that they do fit into the existing programme. Thus, for example, the appearance of new creative phenomena - factors of change within the life of human societies which might seem to present difficulties for an uncritical employment of scientific methods and categories - are slurred over by the very historicism of the Marxist approach. That is to say, by trying to predict change, those tending to such historicism try in effect to bring it under rational control by a surreptitious attempt to efface it.

The specialised study which seems to require an attitude most diametrically opposed to that of the scientist, is history. "The concrete world has slipped through the meshes of the scientific net," for so far as it takes mathematics as its ideal, Physics resolves into the study of differential equations. That is to say, the result of such concentration upon the metrical aspects of the universe is that ultimately the microscopic analysis employed in Physics is not of entities of the external world, but of pointer readings accepted as equivalent to the knowledge of these entities. But historical knowledge cannot be symbolised in mathematical formulae. It is just this "concrete world" from which the scientist abstracts that the "intuitive", as distinct from the "scientific" historian claims to have captured.
In contrast to the abstract nature of science, which studies a minute fraction only of what comes under observation, the historian is pledged to take into account as much of the concrete detail falling within the prescribed stretch of time as his selection permits. * Science is concerned with the repetitions to be found within nature, aiming to reduce the appearance of infinite variety to a formula of uniformity. History, on the other hand, emphasises what is new and original in each succeeding generation; it aims to reveal a world in which personality and individuality are more significant than repetitions ** a world which, indeed, never repeats itself.

Historical exploration, consequently, is not given in terms of general laws of sequence; in history the "individual" is the principle of explanation. An event is

---

* It may be remarked here that there is an ambiguity between "the concept of history" and "historiography". The former does include everything, in all its concrete detail; but it cannot, for that reason be fulfilled. Historiography, on the other hand, must select.

** Trevelyan, for example, writes "... the study of mankind does not resemble the study of physical properties of atoms or the life history of animals. If you find out about one atom you have found out about all atoms, and what is true about the habits of one robin is roughly true about the habits of all robins... Men are too complicated, too spiritual, too various for scientific analysis... history... deals with intellectual and spiritual forces which cannot be subjected to any analysis that can properly be called scientific."

History and the Reader.
"explained", or the "cause" sought, by its being shown to follow, for example, from a previous decision taken by a king or a statesman. The necessity of the interrelations which the historian discovers within a particular series of events is, therefore, not the necessity of scientific law which relates universal characteristics. A scientific theory, such as that of Toynbee concerning the laws governing the disintegration of civilisations, may also be constructed upon the basis of extensive historical data, but this, however valuable and important is to go beyond history per se. Historical explanation can account for the rise or fall of particular civilisations, but to account for the rise and fall of civilisations as such is to leave history for what is strictly a scientific order of explanation. History generalises, but the generality of its statements is not that of scientific laws; historical propositions are particular, not universal. They are general in contrast to the mass of detailed individual actions and events from which the historian selected that aspect of most outstanding significance (in relation to other particular events) or of chief relevance to his purpose.

This difference in the nature of historical from scientific "explanation" accounts for the criticism of "scientific knowledge" and the different description of the knowing process given by non-scientific historians.
Bergson, for instance, taking an historical point of view, stresses the active force, and formative power of man without which history would be meaningless. Every event, he claims, is unique and every process irreversible. The principle of Uniformity of Nature is replaced by that of Infinite Variety of Nature. The analysing intellect of the scientist is, in consequence, inadequate for obtaining knowledge of such a world. Hence Bergson's philosophy goes to the other extreme in its criticism of scientific thought, laping into a form of irrationalism where knowledge is attained not by intellect, but rather by its suspension in favour of another attitude of mind - intuition. For Intuition alone - a faculty of merging oneself within the flux of things - can recover the infinite variety which is concealed by the scientific pre-occupation with uniformities, the abstractions of necessary and unchanging law.

A second example of an historical metaphysic at war with that of science is seen in Collingwood's *Philosophy of History*. The historian, he insists, is concerned with events so far as they express thought. Whereas the scientist is concerned with the phenomena of nature as a spectacle presented to his observation, the historian looks not at, but through events to discern the thought within them. That is, he must draw a distinction between the "outside" and "inside" of events. Although concerned with both, it
is the latter — which can be described in terms of thought — which is of chief importance to him, history's primary function being to afford knowledge of mind. Collingwood justly goes on to point out the change in the categories employed in obtaining knowledge in this field. Words like "cause", for example, are used in a special sense. The cause of the event, (e.g. why Brutus stabs Caesar) for him means the thought in the mind of the person by whose agency the event came about; and this is not something other than the event, it is the inside of the event itself. That is why he claims that all history, being the history of thought, is the re-enactment of past thought in the historian's own mind.

Whilst such points as are brought forward in these two examples — of both Bergson and Collingwood — present valuable correctives to the "horizontal abstraction" of science, and to the "scientific histories" which would apply this as it stands to the historical world of human activity, it is important to remember that this alternative historical attitude is also based upon an abstraction, albeit of the second (vertical) rather than the first type. The "intuitive" historian is no more able to give a "concrete history" than the "scientific", but also must narrow his field.

In the first place — the historian aims to give a significant account of events, which means that he must select.
Consequently there can be no concrete history - no universal history of mankind - but only many histories of all kinds of aspects of human life. A concrete history would have to record all human hopes, struggles and sufferings. It cannot, therefore, be written - the historian must make abstractions. The danger of forgetting, then, that his account is an abstraction is the more potent because it is, in general, the history of power politics which has been selected - "... the history of international crime and mass murder which has been advertised as the history of mankind". (Popper.) For this reason it is perhaps mistaken to seek a "meaning" in history, particularly in the sense of a God's revelation of Himself in the abstraction which purports to be the history of mankind.

"To maintain that God reveals Himself in what is usually called 'history', in the history of international crime and mass murder, is indeed blasphemy; for what really happens within the realms of human lives is hardly ever touched upon by this cruel, and at the same time childish affair. The life of the forgotten, of the unknown individual man; his sorrows and his joys, his suffering and death, this is the real content of human experience down the ages... But such a history does not, and cannot, exist; and all the history which exists, our history of the Great and Powerful, is at best a shallow comedy..."


Further, in order to select, the historian must evaluate, and in doing so leans heavily upon generalisations (including those of science) operative within the time of his
writing. The notion that there can be such a thing as "pure history" which avoids this, and which is independent of moral and aesthetic prejudices, metaphysical principles or cosmological generalisations, is completely fictional. "The belief in it," as Whitehead * rightly remarks, "can only occur to minds steeped in provinciality - the provinciality of an epoch, of a race, of a school of learning, of a trend of interest - minds unable to divine their own unspoken limitations."

Secondly, instead of selecting and concerning himself with the universal, repetitive features of the world, an historian such as Collingwood abstracts from them the unique, formative human factors of thought and action without which history would not exist. But equally, without the general characteristics, the uniformities, these factors could not be related nor even have existence. Collingwood derides the idea of an eternal human nature, for example, but without some constant element in human nature it is difficult to see how the "reliving" of historical situations of which he speaks would itself be possible. Likewise, without the regularities, material causes, etc., formulated by natural science, it is hard to see how the unique achievements of the personalities in human history would be possible.

Moreover, what does it profit their case to deny the

* Adventures of Ideas.
validity of scientific regularities? Just as a fixed alphabet and vocabulary do not prevent poets from continually enriching civilisation with novelties in poetry, so the element of sameness in nature and history does not necessarily obstruct a continual appearance of difference. The two factors of sameness and difference are both required. Thus, the specialised activities which concern themselves with one or the other must be recognised each for the abstraction it is. In this way alone can progress be achieved.

There is, as Collingwood pointed out, no essential feud between the natural sciences and human studies, since they each work from different perspectives, asking different questions about the world. Their categories and methods differ because, to use Collingwood's terminology, they work with different presuppositions.

Thus science and history are mutually complementary branches of knowledge, representing alternative ways of building upon immediate experience. The one emphasises the formative influence of the individual, the other, changeless laws in terms of which routine events can be formulated. It is in the interest of theory and practice alike that balance and due proportion needs to be established between them. By indicating the presuppositions of each, the
metaphysical assumptions lying at the basis of their particular approach to knowledge, the different questions asked by each, one of the services rendered by philosophy is the establishment of just such balance and due proportion between these and like "abstractions".

---

The examples in the preceding discussion have concentrated somewhat exclusively upon science and history; but were there space to do so, one might indicate the "abstraction" involved in every form of human knowledge without exception. Even Art, which has perhaps the most valid claim to represent, and put men in touch with, concrete reality, is only possible by abstracting from the full concreteness of personal consciousness. It relates men "one-sidedly" to the world, since, as MacMurray points out, being like science a reflective, and therefore a symbolic, activity, it too abstracts from the practical aspect of men's relationship to the world. Consequently it isolates individuality from the general scientifically discovered conditions under which alone it can exist, and misrepresents the individual as complete in itself.
CHAPTER II

LOGIC AND SPECIALISATION WITHIN PHILOSOPHY.

All thought, Whitehead reminded us, involves abstraction; all thinking - and a fortiori all communication - involves selection. Whereas the analytic mode of selectivity involved in scientific thought separates universal characteristics from that which, as concretely given, they are in fact conjoined, in philosophical synthesis, on the other hand, characters which are in fact disjoined become combined in accordance with some pattern of selection. This is not, however, the only form of abstraction within philosophy. The preceding chapter has been concerned with some of the types of abstraction resulting from the distinctive methods of study appropriate to particular disciplines such as science and history. The investigation of those peculiar to philosophy, therefore, may be illuminated by first discussing the philosophic parallels to the resultant "horizontal" and "vertical" abstractions of such specialisations.

Although philosophy is not itself distinguished from specialised studies of this kind in virtue of a special subject matter, being committed to taking into account all
all aspects of experience, it, too, necessarily omits certain concreteness of detail in expression. This is brought about by a striving for the generality and impartiality which is thought to be attainable by achieving a more abstract point of view. Similarly, philosophy has its own departmentalism - the specialisation of different aspects concerning art, science, history, ethics, logic, etc. - upon one or other of which it tends to base its selective pattern of "synthesis".

These forms of abstraction, as in the case of particular disciplines, are not intrinsically misleading. The extreme of the first position, for example, is logic. But here the potential dangers of this attitude are diminished so long as logic remains abstract, and no attempt (such as that of Hegel) is made to make the abstraction itself "concrete". It does, however, raise directly the problem of the "universals" employed by logic, the consideration of which enables us to understand, for example, Idealist criticisms of the abstraction of logic, and also to appreciate the differences as well as similarities with its parallel in science, with scientific generality.

Scientific classifications involve the abstraction of general characters from the particular "occasions" (to use Whitehead's term) in which they occur. The latter are not of intrinsic importance to science, but are significant only
in verifying general propositions. As the abstraction becomes more complete, science passes from its classificatory stages to measurement and mathematical formulation. Thus mathematical-physics represents the extreme form of scientific abstraction, its discoveries being expressible in mathematical formulae which are completely disconnected from any particular occasions, in formal propositions which, as they stand (i.e. without interpretation) involve no reference to the actual world.

Such completely formal, mathematical forms of expression are, however, inappropriate even to some branches of science—notably those such as biology, concerned with processes of growth and decay and with living organisms which cannot be studied in complete disconnection from their concrete environment. The biologist, for example, cannot confine himself to the constant conditions and routine processes of living organisms, but must, it seems, acknowledge and take into account any evidence of "direction" or of "controlling factors", of essential integration with, and influence of, the environment, at work within the phenomena. The insufficiency of mathematical symbolism, of scientific categories derived largely from physics, to comprehend all branches of science itself is stressed by many scientists (particularly biologists) and philosophers of science. Things can be represented mathematically only in so far as
they are orderly but, in fact, many biologists for instance would insist that on close observation a natural event can be seen to involve some variation, however slight, in every repetition and that for this reason mathematical description is always but an approximation. And since not all natural events are of a repetitive kind even to this extent, it would seem mistaken to regard them all as completely described by formulae appropriate to merely routine events.

These factors of individuality, of organic relationship with the environment, etc., similarly influenced Idealist philosophers in their criticisms of the categories of traditional formal logic (cf. footnote to page 40).

Logic, we have said, may be taken as the extreme case of the "horizontal" abstraction made in the service of complete generality. As such it is the basis of mathematics. The

---

* "... there seems to be a certain naiveté in assigning stereotyped class characters, or applying fixed formulas (sic) to highly individualised events, facts or persons, and then considering them to be completely characterized. While such a procedure may often be practically useful, or necessary, it is at best an approximation and, when employed without judgement, may give deceptive or unrealistic results. Whitehead's 'fallacy of the perfect dictionary' has reference to unrealism of this kind."


He draws an interesting parallel between such diversity in "sameness" operative in the natural world and "the representation of a musical composition by notation, a mathematical scheme which, as such, is constant, although the individual performances may vary widely."

Ibid. p. 122.
mathematical operation of "counting", for instance, is not itself logically simple, but presupposes the notion of similarity; thus the definition of number by means of similarity led to greater generality and constituted an important step in establishing the logical foundations of mathematics.

This complete abstractness and utmost generality attained by the achievement of the ideal of pure form was, however, to the Idealists, a "vicious" form of abstraction within philosophy. They were not content with the seeming assimilation of philosophy to mathematical physics and with the logic which resulted therefrom. The real object of philosophic knowledge, as of that of the artist and historian, they insisted, was in some sense individual too. Any attempts, therefore, to apply the abstract universal concepts of a scientifically orientated logic must blind the philosopher to the richness and individuality characterising the Truth which is his proper quest.

The Idealist criticisms of traditional logic derive from a particular theory of truth, according to which the ultimate object of thought is "an all-inclusive system in which everything is related to everything else". (Blanshard.) The immediate origin of this theory of truth lay in the teaching of Hegel, that everything short of the whole is prey to contradiction; parts qua parts are necessarily "irrational".

* I.e., leaving aside the question of earlier sources, notably Spinoza.
This metaphysic in turn is the logical ground of the correlative doctrine of "degrees of truth" (according to the degree of abstraction from the context) and likewise of the conclusion that all classification is to a great extent arbitrary. But the "abstract universal" of traditional logic presupposes that we can find classes. Therefore, the argument runs, this theory (and the metaphysic of "external relations" which goes with it) must be replaced by one closer to reality — that of the "concrete universal" and "internal relations".

This contention may be challenged on purely logical grounds: that in the course of putting forward his view as a reasoned argument, the Idealist is contradicting himself. For, one may object, the internal relations demanded by this theory do not permit of the identity required in reasoning. All reasoning proceeds through the use of constants called universals. That is, it always depends upon something like the middle term of the syllogism remaining the same. Without such a strict identity in the terms — that is, without "manhood" in the traditional example remaining the same in all men — there can be no argument and no communication. But such identity is destroyed by the theory of internal relations.

Whilst admitting that reasoning proceeds through a universal, however, it is to the traditional conception of
its nature that the Idealist objects. Regarded "abstractly" as an identity which admits of no diversity within its various contexts, far from making inference possible, universals destroy the unity of inference by dissolving it into a set of unrelated terms. A property such as "manhood" or "red-hairedness" is arrived at by abstraction, in the same way as the middle term. But in fact such generic propositions are not identical throughout their exemplification. For example, red hair or typhoid is different in Mary from red hair or typhoid in Michael. Such bare identities, therefore, in fact render reasoning impossible. For reasoning involves necessary connections, whereas it is impossible to abstract certain qualities and find they imply others irrespective of the context. Hence such abstraction removes the necessity of the connection which reasoning presupposes.

The last part of the above (characteristic) argument seems to beg many vital questions. Not the least of its defects, for example is that it assumes that the connections existing between qualities concretely expressed within a context are of the order of logical necessity. Until this assumption is justified, it is not legitimate to accuse traditional logic of creating such epistemological problems in virtue of its "abstractions"; unless the universe can be shown to be a "logical system", the problem of how it is
that Reason "fits the facts" exists in any theory. Furthermore, the term "necessary connection" is here employed in a very peculiar sense, since it is precisely from the formal reasoning of logic that it is, as generally used, derived, being only applied by analogy within other spheres.

The first relates to the idea of formality. The logician's ideal of complete generality is attained by making his assertions completely formal. The validity of an implication thus rests upon its complete abstraction from material constituents.

"In the pure propositional form of implication, the material constituents are replaced by variables, the formula expressed by logical constants. Since it is completely formal, there is no reference to any given instance; the implication can be asserted concerning anything that can be fitted into the form."

(Stebbing. Modern Introduction to Logic. p. 165.)

The anti-formalist would, however, question whether any inference of truth value within a concrete subject matter could be fitted into such an abstract pattern in any fruitful way. Some writers - Collingwood is a prominent 20th century instance - have perhaps over-stated their case in claiming that it is impossible for the validity of their inferences to be attested by any logician outside the concrete detail of the subject. On the other hand, such objections call attention to an ambiguity in the conception of a completely formal logic, the overlooking of which creates the "vicious" abstraction in this subject. Logic,
like all science, is indeed formal in the sense of dealing
with the common elements in all modes of thought. On the
other hand, the claim for the formality of logic has fre-
quently gone beyond its similarity with science in respect
of concentrating upon the universal characteristics in a
topic and has excluded the consideration of those modes of
thinking which may be peculiar to a particular subject
matter and not universally exemplified. To this, Idealists
and others have, rightly I think, objected that the claim
to detect a pattern of inference applicable (without modi-
fication) within every sphere of study is a chimera. It
is, as Joseph succinctly expresses it,

"... as if the botanist were to regard only those
laws which are exemplified in every plant, or the geo-
meter were to consider no properties of figures, except
what are common to all figures. They have thought that
one might abstract entirely from and disregard all ques-
tion as to what he thinks about, and still find that
there are certain principles in accordance with which,
if he is to think about anything, he will think. But
the truth is, that we think in different ways about
different kinds of subjects, and therefore we must, if
we wish to study the principles that regulate our think-
ing, consider to some extent the differences in the mat-
ter about which we think. The distinction between form
and matter may as it were be taken at different levels."
(An Introduction to Logic. p.5.)

It is true that Idealist arguments have frequently been
defective in virtue of a failure to distinguish between
psychology and logic, between actual processes of inference
in use and the task of validating the results after they are
attracted. * Nevertheless they have pointed to the need to modify the "patterns of thought", logical concepts and definitions, within different spheres of application, which is often overlooked. They have provided a salutary reminder of the errors associated with "the Fallacy of the Perfect Dictionary" (and of the similar fallacy of a perfect logic); of the fact that, to put it in Whitehead's terms, the possibility of complete abstraction from the environment suggested by single words with dictionary meanings, and single sentences bounded by full-stops, is metaphysically misleading. It is, moreover, no less practically dangerous in that it encourages the transfer-ence of notions valid for one "perspective" of the universe, and their uncritical application to another group of events whose "perspective" differs in significant respects.

Secondly, arising from this it can be seen that the Idealist line of criticism suggests that there may be a significant difference between the universal concepts required by scientific reasoning and those of philosophy. The former are at least valid from a pragmatic point of view within limited contexts. In philosophy, on the other hand, the barriers serving such a pragmatic defence are

* This is a confusion similar to that between scientific method and logic which appears in some recent criticisms of philosophy and science (e.g. Toulmin, Wisdom).
Logicians can defend their classifications by pointing out that science does assume such continuity in both physical and mental spheres as the "abstract universal" implies. That is, whilst admitting a certain change of detail in different contexts, science must assume the existence of some similarity underlying the difference. Even Whitehead, a defender of "internal relations" in at least one of the many forms the theory has historically taken, requires his "eternal objects" which "ingress" into actual events. Without the possibility of abstracting in thought the elements in common possessed by particular events, the attempt to formulate "scientific laws" would be futile.

* In this connection it must be remarked that some objections which have been put forward by Idealists seemed to be based upon a misconception of what is involved in the use of a "general idea". To argue that the more general thought becomes (i.e. using universal concepts which refer to sets of properties possessed in common by particulars) the emptier it becomes since, of course, less and less will be possessed in common, is to ignore an important distinction between the intension and the extension of an expression. Certainly the "abstract universal" has become emptier in intension in proportion to generality, but it is by this means that it has become fuller in extension. It thus refers to more things as having the particular qualities in which we are interested in a particular context. But this does not mean the intensional aspect is ignored; the fact that as formal concepts their explicit concentration is upon extension does not preclude the qualification of their use within particular contexts by focussing upon the intensional aspects of which they seem to be a form of shorthand. By focussing attention upon the "abstract universal" at some stage, thought is not irrevocably cut off from its particularisations within concrete instances.
Nor does the fact that every scientific investigator works within a restricted "universe of discourse", which prescribes what is "relevant" to his investigation, necessarily imply that his classifications and judgements of relevance are metaphysically arbitrary. The fact that they do "work" does seem to indicate something concerning the natural world, even though it be dangerous to draw far-reaching ontological conclusions or construct a dogmatic metaphysical theory upon this basis.

The Idealist type of view does, on the other hand, effectively draw attention to the fact that such abstracted characteristics are, in actual experience, always found in intricate connection with others, and so issues a warning against this particular fallacy of "misplaced concreteness". Attempts, at an ontological level, to maintain a right separation into classes which do not cut across each other; to conceive the world in terms of atomistic entities bearing no intrinsic relation the one to the other; to construct a metaphysics of Reality on the basis of such practical "judgements of relevance" within limited contexts and purposes,

* "The 'objective Idealism' of Germany, if it has done nothing else, has loosened the belief in the separateness of things distinguishable and in the possibility of describing living things by any category which does not 'share in the living thing's complexity'."

Muirhead. The Platonic Tradition in Anglo-Saxon Philosophy.
which science quite legitimately makes; - all these evidences of "misplaced concreteness" have led their adherents into ultimate inconsistency or else a frank rejection of the "phenomena".

It is, however, to the perceivable similarities underlying differences, in however close interrelation the two in fact exist, that the universal concepts of logic have been applied; it is in respect of groupings convenient for the particular purposes of science or commonsense practice that such "classifications" have been made. If philosophers have in the past been misled into untenable inferences by their own abstractions, criticism must be directed towards the understanding of the nature of the abstraction and its inevitable limitations, not to its out-right denial.

Misdirected attacks against science, and the bearing of traditional logic upon its inferences and terms have tended to conceal some of the significant points which the differences between science and philosophy may introduce into this topic. Their definitions and classifications, for instance, are not on precisely the same level. Scientific definitions are arrived at by empirical methods, the classifications upon which they are based undergoing continual modification. They (the definitions) tend to start as descriptions, but finish up as analytic definitions of the terms used. There comes a point, that is, when, upon the appearance of an awk-
ward phenomenon, rather than alter the classification upon which the definition is based, the scientist would refuse to apply this particular name. Thus, the reply to the enquiry - "if one had established a statement 'all swans are white', would the discovery of black swans lead one to amend the definition, or to refuse to call it a swan?" - seems to be that it depends upon the stage of the classification in other respects. In so far as philosophy has traditionally sought definitions (leaving aside the debatable question concerning the error involved in such a search *) they, on the other hand, have claimed to be "real" definitions. As such, they have the ultimate aim and not the starting point of philosophy, and never reached the stage of being so clearly marked as in science. Likewise, as Collingwood has pointed out, the classifications upon which they were based differ from science in one important respect. The specific classes of a philosophic genus do not exclude, but overlap one another. The traditional metaphysical predicates of unity, reality, etc., were assigned by the philosophers using these terms to every order of "being". On such grounds as these, it is possible to defend the suggestion that the universal concepts of science and philosophy differ significantly, and the traditional assumption that the former are of un-

* The following remarks are made in the past tense in order to avoid positive assertions upon this point which would require longer defence than space permits.
changed application in all subject matters, particularly within philosophy itself, should be questioned.

In supporting Collingwood's thesis * on this point, it is not being suggested that philosophy has its own logic. The point is that universal concepts must not be uncritically assumed to be univocal within both philosophic and non-philosophic spheres; for to neglect the examination and clarification of their possible dual significance constitutes one of the ways in which misleading associations may be introduced from one sphere to another. Where a concept has such a dual significance, in its non-philosophic phase it qualifies a limited part of reality only, and thus as philosophically applied it may colour the conception of reality as a whole in terms of characteristics pertaining to the "part of reality". A case in point is the traditional use of the word "matter". As this point, however, clearly relates to problems of metaphorical and analogical extension of words within philosophy, more detailed discussion of this topic must be deferred until succeeding chapters.

The immediate relevance of the above considerations lies in the potential danger deriving from the authoritative support which a purely formal and abstract logic may give to such uncritical transference of terms. It is in this respect that we consider Idealist criticisms of the "abstractions"

* Essay on Philosophic Method. Chapter II.
of traditional logic — of its formality and its "abstract universals" — however misplaced against scientific classifications and modes of reasoning, to have made an important contribution to elucidating the potential dangers of philosophic generality.

They have rightly questioned the immediate assimilation of philosophy to scientific rather than historical and artistic forms of "knowing" (although formally philosophy resembles science rather than art in its mode of reasoning).

For, despite the prima facie resemblance in virtue of the concern for the universal aspects of knowledge, the ideal of generality itself is, in the hands of philosophers, employed for a different purpose from that of science. The aim of the physical scientist's generalisation is to enable him to manipulate his material so as to make fruitful predictions and so extend man's control over the events within the physical universe. This, as was pointed out, entails some degree of bias in the approach to his subject matter. The scientist must select — must ignore certain factors as "irrelevant". The aim of philosophic generality, on the other hand, lies in an opposite direction, being that of keeping open all lines of investigation in an effort to see things "synoptically" and so overcome partiality.

To sum up, the precise relevance of the problems of logical abstraction to the achievement of such philosophical
generality (discussed in more detail in the remainder of this Section) seems, then, to be this. In the expression of its general ideas, philosophy like every other study, must employ the universal concepts of logic. If, however, those universal concepts are themselves derived from, and conceived solely in terms of, a scientifically based logic, two consequences running counter to that end may appear. Either the general ideas expressed will in fact exhibit bias; or, alternatively, if an attempt to avoid this is made by employing them with less than scientific precision, the philosopher will be suspected of contravening the simplest rules of clear and precise thinking, thus creating unnecessary "puzzles". It is, therefore, of considerable importance to show that there is a valid distinction between the universals of science and those of philosophy, and to indicate where it lies. To this, Idealist criticisms of traditional logic have – albeit perhaps indirectly – significantly contributed.

The special nature of philosophic generality instanced above renders more acute the existence of what was termed a "vertical" abstraction within this subject, occurring, as in particular disciplines, as a result of specialisation. "Synthesis", we said, (p. 39) combines in accordance with some chosen pattern, characteristics which are in fact disjoined. The philosopher is a "specialist" too; the fact
that his speciality is connecting principles, and that his selection abstracts from the details of other particular studies, does not lessen the potential danger of his making a rigid distinction between the different spheres of this task.

Although we are here speaking particularly in terms of the "synoptic" activity of philosophy, these points are substantially the same in respect of analysis (since analyses do not immediately gain universal acceptance, and in the subsequent debates they provoke demand the consideration of wider contexts of related notions); whichever of these philosophic activities is emphasised, a division of its topics into mutually exclusive topics is liable to be misleading, because philosophic problems cannot be solved piecemeal. As in the case of other specialisations such a division introduces necessary simplification. To distinguish between ethics, logic, metaphysics, politics, etc., is of methodological value, in as much as it clarifies problems within the fields thus distinguished. The over-emphasis of such distinctions, however, leads to superficial consistency and over-simplification. Consistency, it is true, and clarity of expression grow with abstraction from a concrete subject matter, (i.e. in proportion to increased formality); but in philosophy, "Clarity is not enough", and pre-occupation with devices for its attainment may obscure
the complete understanding of the complicated problems involved.

"In the study of ideas, it is necessary to remember that insistence upon hard-headed clarity issues from sentimental feeling, as if were in a mist cloaking the perplexities of fact. Insistence on clarity at all costs is based on sheer superstition as to the mode in which human intelligence functions. Our reasonings grasp at straws for premises and float on gossamers for deductions."

(Whitehead, *Adventures of Ideas*, p. 91.)

Synopsis and synthesis (and analysis too) may take place at different levels; but to remain at one level will yield only "straws" and "gossamers". In that aspect of philosophy which seeks "descriptive generalisations", such principles of synthesis must first be attained at the level of a single department of knowledge. There must be philosophies of science, of history, of art, etc., severally directed towards understanding and theoretically connecting the events and activities practically discovered (or "enjoyed" in the case of art) and pursued by the scientists, historians and artists themselves. There must be, at this level, attempts to formulate in adequate conceptual schemata the concepts and principles, methods and presuppositions, characteristic of each of these separate departments. But without co-ordination at a yet "higher" level, the philosopher's task is incomplete; he must indicate connections between these different branches, as well as between the particular events within such spheres. In this way, the
correlation of each set of "principles" - of the philosophies of science, history, art, etc. - may both introduce "internal" clarification, and indicate the essential modifications of each to be made outside its strictly limited sphere. For it is only by ascending to the utmost generalities defying any "watertight compartments" even on the level of philosophy, that philosophy can challenge the "half-truths" constituting the first principles of science or any other specialised study. * The "criticism of abstractions" which is philosophy's special function requires a generality, an order of synthesis transcending the boundaries of philosophic "departmentalism".

Philosophers, in short, are not exempt from misleading simplifications similar to those exhibited by "professional" writers who refuse to discuss the more philosophical bearings of their problems - the strictly metaphysical and ethical aspects for instance - and yet pass value judgements in all spheres, inevitably presupposing some theoretical conception of the nature of man and his place in the universe

* "All general truths condition each other and the limits of their application cannot be adequately defined apart from their correlation by yet wider generalities. The criticism of principles must chiefly take the form of determining the proper meanings to be assigned to the fundamental notions of the various sciences, when these notions are considered in respect to their status relatively to each other. The determination of this status requires a generality transcending any special subject-matter."

Process and Reality. Chapter I.
in all their thinking. As non-philosophic and philosophic examples of this form of "abstraction", we may compare Toynbee, and Russell respectively.

The former professes a thoroughly "scientific approach" to his subject matter, yet at the same time clearly shows the extent to which his judgement upon the thoughts and actions of historical characters is dependent upon implicit metaphysical presuppositions (concerning human nature particularly). His *magna opus* shows the impossibility of considering wisdom or folly, progress or decadence, except in relation to some standard of judgement, some end in view. Such standards inevitably guide the composition of historical narrative, no less than the course of events within history itself. Russell, on the other hand, does discuss metaphysical questions to some extent along with the epistemological, but, generally speaking, has made little attempt to render consistent or coherent with these the "principles" of his more specifically ethical and political writings, or to take into account the bearing of the latter on the former.

It is often in the political sphere, in question-begging social doctrines, that this form of abstraction has its most unfortunate effects. The detachment (both of aspects of philosophy and of specialised departments of knowledge) is all the more dangerous in that it can only be superficial. For, speaking generally, it seems historically
true to say that those who neglect such correlations, or who decry metaphysics or evade ethical considerations, will either uncritically share the ideas of their age, or be tempted to make a metaphysics out of a method. Or, if not this, be unable to propose any reason for the adoption of one political programme rather than another. A disciple of Hume, for instance, would admit that on his premises no reasons could be given for a dislike of slavery - only psychological or social causes of a "belief" in its wrongness. Yet on what grounds could he then oppose a political programme (expressing perhaps the majority opinion) which gave support to such a system? As Whitehead somewhere remarked, there seems no very obvious reason why one flux of impressions should not be related to another flux of impressions in the relative status of master to slave! It has certainly not seemed "self-evident" to all intelligent men.

Finally, if a philosopher restricts his "universe of discourse" to one or other watertight compartment, and neglects the "ragged edges" of diverse philosophic topics, he also suffers from the practical defects seen in connection with the specialisation of more technical subjects. To keep ethics and psychology, or anthropology, for example, rigidly distinct, not only encourages psychologists and anthropologists to make ethical assumptions uncritically, under the illusion of avoiding them; ethics itself (although
perhaps to a lesser extent) may be aided by relevant considerations from these more scientific fields. The important thing is that the lines of connection should at least be left open between them, although neither should be allowed to dictate to the other; it is always advisable to be alive to the possible ramifications of a selected topic, in so far as what are \textit{prima facie} alien considerations may, in fact throw light upon it. Similarly, ethical questions have logical as well as ethical aspects. Thus, objections levelled against those moral philosophers who write upon the logic of ethical concepts are misdirected, since even moral philosophy in a more "full-blooded" sense cannot dispense with the examination of the terms it uses, and the logic of its statements.

It would be incomplete to conclude this discussion without making some mention of another form of vertical abstraction - one made "in time", as it were - which is less permissible in philosophy than elsewhere. It is sometimes thought that by taking into account its own history, by paying attention to earlier writers, a subject becomes merely authoritarian, and hence so hopelessly unscientific that it cannot achieve progress as other sciences do. For this reason (although an argument of lay or scientific writers rather than philosophers) it is sometimes advocated that philosophy should narrow its interest historically and con-
centrate upon contemporary thought and problems. Only in this way, it is implied, can progress be made here as in the natural sciences.

It is possible to say (although with some reservations *) that scientific progress has depended historically upon the ability to discard out-dated theories as irrelevant for its immediate purposes. That is to say, in the sense of practical control over nature, of advance in obtaining new facts about the natural world, science certainly made little progress until it rejected Medieval habits of appealing to past – particularly Aristotelian – authority.

Philosophic theories, however, do not become "out of date" to anything like the same extent. This relative "timelessness" of philosophy follows from the features in which its search for generality ultimately differs from that of science.

Both enterprises signify a refusal to be satisfied with a mere welter of fact and base their activities on the faith that underlying every routine occurrence is some general principle which may be stated in abstraction from its particular exemplification. Philosophical theories in which such principles are formulated are not, however,

* The reservation especially necessary is that even here, progress depends upon building upon knowledge of the past. The advances of Einstein upon Newton, for example, are made by building upon the theories of the latter; by knowing just what were his problems and how he solved them.
concerned with verifiable factors. For philosophy is not concerned with limited fields of experience but with factors pervading the whole - factors which, just because they never fail of exemplification, are the most difficult to formulate. This means, then, that philosophical theories are more in the nature of "interim reports" as to the nature of things co-ordinated from one perspective, than final disclosures of the ultimate metaphysical principles of the universe. It means equally that the theories cannot be disproved either by the appearance of new empirical facts, or by rival theories. The consensus of a body of professional opinion has not here the significance it has in science or other limited bodies of knowledge; rather, indeed, is the disagreement of its practitioners a necessary sign of its healthy flourishing. For whilst different sciences supplement the omissions of each, engendered by their particular selective abstractions of the whole, there are still aspects of reality universally omitted from the framework of science - in particular, features of personality, of individual idiosyncrasies. Philosophical theories, on the other hand, so far as they are concerned with the "whole" which science has disintegrated, cannot be divorced from the "personal equation", the individual point of view from which they arose.

The above considerations suggest, then, that the
method of "descriptive generalisation", involved in philosophy will present a form of abstraction going beyond those shared (with modifications) with the particular specialisations so far discussed. It is to the services rendered by this peculiarity of philosophy, as well as with its special limitations, that subsequent discussion is to be devoted. This Section will therefore conclude with a brief general examination of some of the problems involved.

The above quotations indicate the two aspects of the "metaphysical abstraction" (as we will term it) with the necessity and special problems of which we are now concerned. The first points to the limitations inevitably imposed upon a thinker by the terminology and current assumptions of his day, and the theories which, in consequence, come to be "felt as facts" within that Age. By the "perpetual natives" of the second is being understood the desire to co-ordinate, to see particular facts in their systematic relation one to another and in their implication of general principles: the desire which, in short, constitutes Nationalism in its broadest sense. * For present purposes, we

* This is the sense in which it may be claimed, with Whitehead, that Nationalism is "an adventure in the
CHAPTER III

THE ABSTRACTIONS OF SYSTEMATIC PHILOSOPHY.

(1)

"Ideas have a pedigree which, if realised, would often embarrass their exponents." (Tawney.)

"And it is the function of critical philosophy to draw and re-draw the limits of human reason from changing points of view in different phases of knowledge; but one must also understand the motives of those who overstep these limits in pursuit of complete and final explanation, since these are the perpetual motives from which Philosophy itself arises . . ." (Hampshire.)

The above quotations indicate the two aspects of the "metaphysical abstraction" (as we will term it) with the necessity and special problems of which we are now concerned. The first points to the limitations inevitably imposed upon a thinker by the terminology and current assumptions of his day, and the theories which, in consequence, come to be "felt as facts" within that Age. By the "perpetual motives" of the second is being understood the desire to co-ordinate, to see particular facts in their systematic relation one to another and in their implication of general principles: the desire which, in short, constitutes Rationalism in its broadest sense. * For present purposes, we

* This is the sense in which it may be claimed, with Whitehead, that Rationalism is "an adventure in the
will confine ourselves to one way in which such philosophers "overstep the limits of reason", namely by their systematic employment of analogies to facilitate such synoptic co-ordination.

Both are (closely related) forms of abstraction. Their precise nature, however, and means of correction, require further elucidation in view of the extreme conclusions frequently drawn from this fact.

All thought involves abstraction in the first sense of being circumscribed by inherited terminology and assumptions: equally evident is the almost insuperable difficulty of becoming critically conscious of what thus constitutes one's habitual assumptions - of doctrines which, in consequence of such inheritance become "felt as facts". But the relativist conclusions drawn from this universal human predicament seem to be mistaken.

Theories of social determinism provide examples of such erroneous inferences. Since thought does not proceed in a vacuum - as the "receptacle theories of knowledge" in vogue before Kant perhaps implied - but is influenced by unconscious elements derived from both social and intellectual background, it is argued that these in fact determine clarification of thought, progressive and never final. But it is an adventure in which even partial success has importance.

one's opinions (the latter appearing to their holder as logically self-evident because he is not aware of having made any assumptions). Similarly the "intellectual inheritance" of a thinker in a particular epoch is thus regarded as a greater obstacle to the attainment of new knowledge than it in fact is.

That the neglect of extraneous factors in the individual's thinking may place obstacles in the way of obtaining knowledge, is undeniable. A refusal to speculate freely on the limitation of traditional methods and categories of thought is deliberate obscurantism. But, as already agreed, where these factors are so embedded in a century's life and thought as to have become assumed necessities of "scientific", or even of "common sense" thought, an unintentional obscurantism is all too easy. Every philosopher has his historical and contemporary environment, and since there can never be a group of human beings with no past or traditional background, allowance must be made for such an "unconscious element" in all philosophy. Thus, despite their disparagement of the "Schools" and current "Aristotelity", 17th century philosophers, for example, were clearly affected by Medieval ideas (as Gilson's researches have shown in some detail) being unconscious of this debt precisely because they had no idea that men could think in any other terms. This is particularly evident in their metaphysical doctrines of
"substance" as well as in much of their social and political thinking.

Nevertheless to contend on such grounds that thought is determined by the environmental circumstances of the thinker - whether philosophic, religious, climatic or social - is superficial. "Conditions" are not one-way relating "causes"; the relation between men's minds and their experience is more complex. Such over-simplification is, indeed, belied by the very fact of disagreement between philosophers; on such a theory, all philosophers ought to agree within a particular period or place - and they clearly do not.

Moreover, any undue "relativity" brought about by the more specifically localised of such factors (i.e. peculiar to a particular individual) is to some extent counteracted by the "social aspects" of knowledge. The degree of objectivity boasted by science, for instance, is achieved not by the "impartiality", the freedom from all "prejudice" on the part of individual scientists, but by the co-operative nature of the enterprise. Likewise in philosophy, to the extent to which agreement on specific questions is a "local" aim, if perhaps not so universal and complete an aim as in science, this function is performed additionally by means of the history of philosophy. In each case, "relativity is directly corrected by the modus operandi of the subject,
rather than by some form of therapy administered by those who are, *mirabile dictu*, free from presuppositions.

Furthermore, the presuppositions of a particular age or locality are not necessarily fixed, but may be modified in the course of experience. Thus Einstein showed that in the light of experience men may come to question and revise presuppositions which had seemed to be most fundamental - to revise the ideas of space and time which had previously been regarded as belonging to the "categorical apparatus" of all science. This, Popper points out, *illustrates the fact that empirical science can eliminate its own "prejudices" one by one. An attempt (such as that of Descartes as well as 20th century "therapists") to eradicate them all at once should be suspect. It will most probably manifest a form of "reinforced dogmatism", thereby destroying the intellectual basis of discussion upon which the critical investigation of presuppositions surely depends. For one of the dangers of any highly general theory is that the plausibility derives precisely from the fact that it is stated so generally that it cannot be wrong. Thus the theories of epistemological determinism (whether by "social conditioning" or "intellectual inheritance") if held in an all-embracing form, cease to be of interest, because they can explain anything, and in consequence cannot adequately

*The Open Society and Its Enemies. Vol. II. Chapter 25.*
meet particular cases; they are not adequate to particular doctrines being opposed, since being so general, they apply equally to themselves.

In philosophy, no less than in science, the influence of inherited terminology (although perhaps here more pervasive) can be corrected by its own activity. This is where the first and second aspects of the "metaphysical abstraction" become closely related; it is in systematic thought that the metaphysical assumptions involved in terminology may become explicit. "All language embodies the deficient insights of earlier epochs," (Whitehead); but the influence of these deficiencies is less potent, and less restrictive of novel thought when their existence is recognised.

The relatively new background of language and ideas introduced by the scientific movement of the 17th century, for example, has seemed to one writer (Burtt) to supply an important clue to the changed conception of man's place in the universe which marks the modern weltanschauung. The change from the confident Medieval attitude to man and his relation to the rest of the world, to an opposite extreme, (seen, for instance, in Russell's A Free Man's Worship) may, he suggests, be due to an inability to "rethink" a philosophy of man in the medium of this changed terminology.

"It might be that under cover of this change of ideas
modern philosophy has accepted uncritically certain important presuppositions either in the form of meanings carried by these new terms, or in the form of doctrines about man and his knowledge subtly insinuated with them..."  
(The Metaphysical Foundations of Modern Science, p. 14.)

Concrete examples of such concepts (e.g. cause) will be given in subsequent historical consideration of some features of 17th century philosophy. The present point is simply the general one that the very existence of this "historical" predicament, this first kind of abstraction to which philosophical thinking about ultimate questions is inevitably prey, itself calls for systematic metaphysics if the potential dangers of its unrecognised existence and influence are to be averted. A mere multiplicity of detail is of little aid to knowledge; in order to constitute relevant "evidence" of direct bearing upon definite problems it must be "informed" and organised by some general idea. Inherited general ideas form the tradition of a civilisation; their acceptance, however, must be critical if they are to fulfil their potential value. Thus philosophy is never absolved from its task of making men critically aware of the "abstractions" which their vocabulary conveying these ideas may embody.

It may, however, be objected that a more economical and less hazardous way of performing this task would be by the purification of language itself. It is largely due to
In what follows it is not being suggested that the language difficulties in philosophy do in fact arise solely from the use of metaphor and analogy, but rather that the latter constitute symptoms of the more fundamental problem of philosophic expression in relation to immediate experience (cf. quotation from Whitehead, p. 288, n.). It is just this difficulty which some critics (e.g. the author cited) underestimate when they criticise the philosophical use of metaphor and analogy, thus treating what is rather in the nature of "symptom" and corollary of the real problem of linguistic expression, as an avoidable "disease".
the metaphorical use of words and phrases that misleading ideas (from the implications of terminology) are introduced into new contexts; an attempt to eliminate these linguistic usages, it may therefore be suggested, would thus to a large extent avoid the afore-mentioned difficulties. In this way, moreover, the philosopher would not be misled into making further abstractions (the second aspect referred to) in the systematic exploitation of metaphor and analogy. For the latter, far from serving any useful critical function as we are contending, is, according to this view, largely responsible for the so-called problems of philosophy.

This objection, which, if valid, undermines the whole basis of the present discussion, opens up a wider issue concerning the nature of language into which it is not here possible to enter in great detail. A brief consideration of the aspect which is most fundamental in this context cannot, however, be neglected. This concerns the possibility of purging language generally, as far as possible, of its metaphorical elements, and so furthering the interests

* "Philosophical theories ... try to operate with ordinary words when they have deprived them of their ordinary functions. They recombine known words in unfamiliar ways, whilst trading on their familiar meanings. But these analogies lead to hopeless difficulties and so it seems that philosophical problems are never solved at all ...." Margaret MacDonald. "The Philosopher's use of Analogy." Logic and Language. p. 82.
of clear and precise thought and eliminating unnecessary "puzzles". *

One of the chief grounds upon which this may be advocated is the "misleading ambiguities" involved. Metaphorical language is permitted by "poetic licence", but is not really respectable in what pretends to be purely rational discourse.

The opposition itself seems to have been of a two-fold nature: on behalf of simple ordinary language, and on behalf of technical language. Philosophers have argued both ways. Some of them, on the one hand, (e.g. Ryle) advocate the use of "common-sense" language in order to avoid linguistic puzzles into which metaphysical analogies and elaborate figures of speech lead. Yet, on the other, one of the chief reasons why others have wanted to construct a specialised, technical language is that ordinary language is notoriously vague and misleading. There always seems to be some doubt, however, on the part of writers on this theme, whether in fact it is ordinary language which has led

* This is, of course, by no means a new idea. The attempt to purge language of all metaphorical elements has been a recurrent theme throughout the centuries and usually proceeds from the same (scientific) point of view. Hobbes, for instance, gives in his list of the "causes of absurdity" sixth place "to the use of metaphors, tropes and other rhetorical figures, instead of words proper," insisting that "... in reckoning and seeking of truth, such speeches are not to be admitted."

Leviathan. p. 28.
philosophers astray, or whether it is the philosophers who have corrupted ordinary language. Or, perhaps one should say, they have tended to be misleading when arguing that the substantives employed in metaphysical language arise from the fact that the syntax of language is such as always to suggest a referent, whilst also professing to use ordinary language as a criterion for philosophy. The seeming ambivalence between defence of ordinary language and criticism of the metaphysical theories (e.g. "the ghost in the machine") which ordinary language implies, arises from the desire to avoid the metaphysical pitfalls into which philosophers may fall. It appears that at the same time as being opposed to technicalities (e.g. to Russell's Symbolic logic) the Rylian claim for example is to elucidate ordinary language, and make it more precise where possible, in order to prevent philosophers from being led metaphysically astray by its ambiguities.

Technical language is, of course, of utmost importance in some spheres - in science, for instance, where it is desirable to avoid ambiguities and to adhere to precisely defined and fixed meanings. But to assume that philosophy is in a like position presupposes that it is known a priori that the structure of the world, including man, is such as could in principle be exhaustively described in terms of a quasi-mathematical language.
This may, of course, (although it seems unlikely) be true: but it is important that this metaphysical assumption underlying attempts to abolish metaphorical language in favour of a technical pseudo-scientific terminology, be recognised as such. It is, for instance, sometimes objected that criticisms of the proposal to extend technical language to all fields rests upon an assumption — that certain fields are unamenable to this treatment. This, it is added, is obscurantist — the sort of attitude which impeded scientific advance for years. Granted it is an assumption — but the point of view from which this objection proceeds is no less so. And the latter is the more dangerous because unrecognised, and because it uncritically carries into human studies methods which may result in a neglect of the peculiarly human characteristics of the subject-matter with which it is dealing. It is also obscurantist, in that by seeking to reduce all social and personal problems to scientific ones, stateable and describable in technical scientific language, it closes other avenues of approach to their understanding.

In parenthesis, we may remark that in so far as they profess to be "critical philosophers", the recognition of the significance of metaphor in certain contexts is of importance even to those primarily engaged in linguistic analysis. Perhaps the main objection justifiably levelled
against the procedure of the latter is not so much that
they have confined philosophy to the study of language, but
that they take an unwarrantedly restricted view of language
itself. If scientific, or quasi-mathematical language
were the only valid mode of expression, all experience
being adequately circumscribed by science, then indeed would
it be desirable to avoid ambiguities by preserving defined
meanings, and to dedicate philosophy in the service of the
noble enterprise of analysing scientific terms and of render-
ing them yet more precise. But language is an expression
of human nature in a much wider sense — and the ambiguities
and metaphors involved in this expression are not diseases
but highly significant symptoms of the nature of reality,
and of man himself, which language is trying to express.
Consequently, to neglect to examine and explore the various
systematic uses of metaphorical language in non-scientific
spheres is in fact to disregard the concrete world from
which science abstracts, and to impoverish philosophy even
in the restricted sense of a linguistic study. Moreover,
to fail to be critically aware of the way in which one is
in fact using words metaphorically is to confine a philoso-
pher to the abstraction mentioned above. The authors of
_The Meaning of Meaning_, for instance, made no reference to
metaphor. Yet their neglect of the fact that their own
scientific terms like cause, reference, organism, stimulus,
etc., have a figurative origin, illustrates the extent to which those who profess to eschew figurative expressions are really confining themselves to one kind of figure.

We conclude, therefore, that there is no a priori reason for excluding an explicit and systematic use of metaphorical language from philosophy, and that there is at least a possibility that the latter may include certain types of problem wherein the subject-matter does not admit of clear and precise formulation, and in which such language is alone appropriate. It is significant that many philosophers resort to highly metaphorical language at some crux in the discussion where it is recognised that precise statement is no longer possible.

A notable example of this is to be found in the dialogues of Plato (and other examples could be found within traditional philosophy) who thus indicated a recognition of a significant feature characterising philosophic statement, namely, that "the primary function of philosophy is to show and not to state". This is not, as is sometimes suggested, the reductio ad absurdum of philosophy but rather a characteristic indicating new directions in which its value and justification must be sought. It has been well remarked that

"... poetry is prior to philosophy, not only historically but also logically. The failure to recognise this, rather than the loss of confidence in the traditional
apparatus of concepts on the part of modern philosophers, is responsible for the collapse of most of the attempts of traditional metaphysicians to explain themselves to empiricists and analytical philosophers. Too often the Metaphysician is gripped by the same hubris as his critic: he has the same attitude to his concepts and terminology as his opponent to his; both fail to see that the primary function of philosophy is to show and not to state...." (J.M. Cameron. "Words and Meaning in Poetry and Philosophy," from the Downside Review. 1953)

It is unsafe to over-press the analogy between philosophy and poetry, in so far as there are, as will be seen, some far-reaching differences. The degree of analogy which does exist, however, affords suggestions of a more positive nature concerning the need for metaphorical linguistic usages within philosophy. Let us examine briefly, therefore, the cognitive function served by poetic metaphor in addition to its purely emotive significance.

One of the significant features of poetic metaphor is its ability to suggest a variety of meanings which are vaguely felt in significant combination - a combination not completely reducible to the sum of separate meanings into which subsequent analysis may resolve it. The effect of the imagery as a whole is such that it is not, therefore, possible to substitute for the metaphorical expression non-metaphorical expressions which would have the same significance since this would be to make precise and explicit what is vague, compressed and implicit.

One may, however, ask whether integrated associations
and meanings involved in poetic and other metaphoric uses of words is of more than emotive value, or perhaps useful in the early stages of a newly developing branch of knowledge, where the required clarity and unambiguity is as yet unattainable, although the required ideal. And indeed, on the basis of an epistemology which defines knowledge as scientific knowledge, adequately expressible in mathematical formulae describing observed repetitions and uniformities, metaphor can perhaps seem to have little ultimate cognitive value beyond this. The "plastic" character of some words is not of direct value in the description of such repetitions and uniformities, being rather a property which facilitates the expression and conveyance of some unique and personal "meaning" on a particular occasion.

If, on the other hand, some kinds of knowledge are essentially "inside" or "participant" knowledge (i.e. as distinguishable from the "spectator knowledge" of science) the special creative activity of man's mind becomes increasingly important. The value of metaphor seen in this connection is more clearly exhibited in poetry than say, in everyday life, since it here proceeds at a more systematic level. Its imaginative metaphor expresses and may communicate such knowledge. The effect of the poetry upon the reader or hearer is more than merely aesthetic or emotional, contributing to an expansion of consciousness. This characteris-
tic of poetry simply illustrates more forcibly, however, an essential feature of the knowing process at all levels of experience. For the ability to recognize significant metaphors and analogies seems to be a necessary part of meaningful experience. That is, far from men being able to construct a world out of bare sense data, were this power wholly absent, all sounds and sights would fuse into one chaotic panorama in which no individual objects would be distinguishable. If a man were suddenly deprived of every vestige of memory, and of all those assimilated, forgotten experiences which comprise one's power of recognition, his cognitive powers would be considerably diminished. Thus with metaphor, there is an important sense in which language is used as a kind of store-house of past experiences, upon which one's ideas come to be built. Metaphor functions as a "semantic conjunction", as it were, of things held apart by analysis: it provides the relations in virtue of which one object or experience lends added significance to another (i.e. by analogical overtones). Moreover, analogies are not, some writers would insist, capricious but are definitely pervasive of the natural world. "These are not the dreams of a few poets, here and there," wrote Emerson, "but man is an analogist and studies relations in all objects."*

* This same sort of point seems to be made by Coleridge, in his distinction between Fancy and Imagination - the former
The use of metaphor and analogy within philosophy, however, goes beyond the literary parallel of poetry. Philosophy shares this characteristic of imaginative art in so far as it also, where terms of speech tend to be too special, "suggests meanings beyond its mere statements". (Whitehead.) But philosophical theories also purport to explain, to offer an interpretation which is of a much more rigorous order than the poet's "illumination". For, despite much common ground, the philosopher's whole attitude to his problems is essentially different from that of the poet, in so far as he must attempt to formulate them with all possible clearness, distinguishing as well as exhibiting connections between them, and wrestling with possible solutions. Poets, on the other hand, as it has sometimes been said, largely suffer and endure rather than state their problems: the latter are practically exhibited in a form of art, which draws attention to them without bringing them into clear contours (although this is not to discredit the sharpness and poignance of the emotional impact which this form of statement makes). Philosophy, however similar in its basic language forms, must, then, seek to go beyond the inevitable obscurity which encompasses all purely poetic

being more a decorative faculty operating upon an "inanimate cold world", as he calls it, casting around to juxtapose things as likenesses, whereas true, primary imagination is the active creative mind which intuits real unity under differences.
expression. Moreover, whereas the poet does not consciously direct his thought to the discovery of "appropriateness" in the associations of his imagery, this being undertaken rather by the literary critic, the philosopher, on the other hand, must explicitly take this into account. He must function, as it were, as his own literary critic. The reason for this difference is that, as already said, the philosopher's analogies are used to interpret and explain experience - the poet, on the other hand, being simply concerned to describe experience in metaphorical and illuminating language.

The comparison with poetry, nevertheless, brings out the essential function of metaphorical language in philosophy with which we are here concerned, namely, as a vehicle for the "synoptic clarity", the attainment of which is so essential to the philosophic task of criticising abstractions. Emphasis has been laid upon the cognitive function of poetic metaphor in this respect of suggesting previously unperceived "relations", because the parallel contribution of metaphorical thinking in philosophical knowledge is sometimes overshadowed by a misleading distinction between "prescriptive" and "descriptive" knowledge in this latter sphere.

In a recent article upon this subject, * one writer

* G.P. Henderson, "Metaphorical Thinking." Philosophical
builds his thesis concerning the essentially prescriptive character of metaphysical statements upon the metaphorical language employed by their authors.

"I shall have to argue that there is an important sense in which a metaphysical system does not mean what it says. From this point of view there can be no fundamentalism in metaphysics. It will be naive, and quite futile, to accept a metaphysical system at its face value, as a descriptive system: to hold, for example, that Spinoza's system says the last word about the universe as absolutely as, in the opinion of some, Genesis says the first word ... It will follow that there can be no 'basic' metaphysics (such as might appear in a Manual of Metaphysics) since basic metaphysics could only be a system that attempted to emphasise all aspects of experience equally."

(Op. cit. p.4)

With this one can agree; but it does not follow from the fact that metaphysical statements are not literally descriptive that they are merely prescriptive. They are, of course, this also, when set (as they must be) in their historical context, and related to the immediate purposes of their author. * To emphasise this aspect of a philosophical system at the expense of all others is, however, parallel to an equally mistaken tendency on the part of some literary critics to consider poetry exclusively (or basically) in terms of its emotive rather than its cognitive elements.

A metaphysician, argues Henderson, always has some "message",


* It must not however be inferred from this that all philosophies are primarily polemical in content.
in the sense of wanting to characterise in a new way some particular aspect of the world or experience. Moreover, he claims, this is not an end in itself, but a means of changing people’s feelings and actions with regard to that aspect. Leaving apart the debatable contention that this is the metaphysician’s primary aim, one can ask if the prescriptive force of such statements does not nevertheless depend in some sense upon their descriptive value, in the same way as the emotive effectiveness of poetry is to a great extent a function of its descriptive or cognitive import.

The emotional effects generated by some kinds of poetry have been assumed by some writers to exhaust the significance of such forms of expression. There is, however, by no means universal agreement on this point, and equally reputable critics would support the view that where there are to be found in poetic texts these alternative ways of interpreting a word’s action - the cognitive and the emotive - it is the former which is likely to have important effects upon sentiment and character. Similarly, one can reasonably suggest that the prescriptive force of metaphorical expression within philosophy does not rest upon a more ultimate significance of its employment, and that it is in this latter direction that we must seek its primary importance.
Of course, such a view rests upon a conception of metaphor which the above-quoted author explicitly rejects, namely that of the impossibility of **complete** translation into non-metaphorical expressions.

It was in consequence of this rejection that Henderson insisted that Spinoza's main propositions, for instance, "are not a series of descriptions of things that can be described metaphysically or not at all;" on the contrary, "it is always possible to describe what they describe in other terms, of common sense, or science." (Ibid. p.5.)

We have already given reasons for believing that metaphor is **not** exactly translatable: and we believe that the correlative view of metaphysical statements is equally mistaken. It would take us too far from the present theme to examine here the detailed examples taken by Henderson from Spinoza (and also Descartes and Leibniz) in support of his view, and must therefore suffice to say that on examination the former at least seemed inadequate, requiring a somewhat forced and questionable interpretation of Spinoza's statements which we do not endorse. More important to note is the manner of speaking of metaphysical descriptions, which excludes the possibility that they may be of a different order from scientific descriptions - connoting rather the "synoptic" arrangement and co-ordination of which we have been speaking. To apply the term
"description" in this connection is, it may be agreed, somewhat strained and unnatural; but if a preliminary classification of statements as "prescriptive" or "descriptive" be assumed (as in the article cited) it is necessary to draw attention to the fact that metaphysical statements are more like the latter — in serving a distinct cognitive function — than merely prescriptive.

This brief clarification of the conception of metaphor which is here adopted was intended also to indicate more precisely the relationship between the first and second aspects of what was termed "metaphysical abstraction"; between the abstractions embodied in the general ideas and vocabulary forming a philosopher's "intellectual inheritance" within a particular epoch, and the selectivity of philosophical synopsis. The significance of this relationship for the present thesis is two-fold.

In the first place, the synoptic thinking required of philosophical "criticism of abstractions" as here discussed, inevitably employs a metaphorical order of expression, extending words from the limited context in which they derive their initial meaning, to describe other aspects of experience, or to qualify reality as a whole. The generalised use of words involved in such philosophy may, I think, legitimately be classed as a case of metaphorical expression, albeit not identifiable with the poetic metaphor
with which philosophic expression was in some respects compared. Philosophy, it is true, does not seek the integrated meanings, the mass of implicit references and emotional associations which is the expression of poetic insight, being concerned with rational argument and more explicit ordering and "justification" of its propositions. Yet the ultimate principles of synthesis suggested by the various orders of synoptic co-ordination can never be precisely formulated, for the very reason that (in addition to possible "weakness of insight") the inadequacies of language (constructed in practical situations and for particular limited purposes) make the literal statement of "philosophical generalisations" * impossible. That is to say, in such philosophy,

"Words and phrases must be stretched towards a generality foreign to their ordinary usage; and however such elements of language be stabilized as technicalities, they remain metaphors mutely appealing for an imaginative leap."

(Whitehead. Process and Reality. p. 6.)

Secondly, metaphorical expression has been seen to constitute a potent means whereby concepts (and the abstractions they embody) are transferred to, and influence men's thinking within, contexts other than that of their technical

---

* Whitehead's term, which he defines as "the utilization of specific notions, applying to a restricted group of facts, for the divination of the generic notions which apply to all facts."

origin. At the same time it has been suggested that a systematic employment of such linguistic forms — particularly the elaboration of one type of metaphor, analogy — enables philosophers to carry out that "synoptic thinking" by means of which they may to some extent mitigate and correct the effects of the former abstraction as it occurs within their own field, as well as elucidating those of particular disciplines.

These two points will be developed in the chapter following. For even the restricted order of analogy (that of a method) being studied in the more historical Sections of this thesis, calls for some consideration of the wider bearing of the topic if the historical illustrations are to be clearly related to the present theme; to the elucidation of the way in which the "synoptic co-ordination" of metaphysical philosophy can provide a critique both of those abstractions entailed by specialised studies and of those involved in its own functioning.
CHAPTER IV

THE ABSTRACTIONS OF SYSTEMATIC PHILOSOPHY.

There is a true sense in which philosophy endeavours to say what cannot be said. It attempts to convey in propositional form statements which cannot be called "descriptive" in a strictly scientific sense, and yet which do purport to indicate features significant of "reality as a whole". This latter claim may be interpreted in two ways; as representing one or other of the forms of thinking earlier distinguished as "speculative" and "synoptic". The first claim may refer to a metaphysical order of "being" behind particular events of empirical reality, about the nature of which philosophers can attain some measure of knowledge, or concerning which they can at least form some "probable hypothesis". The second claim is primarily to be able to connect in some significant relation the diverse, separately given aspects of experience and knowledge, in such a manner as to suggest more general principles underlying these individual "sub-structures". That is to say, it is a mode of thinking which tends not to be a satisfactory end in itself, but to suggest a further "synthesis",
which supplies concepts and principles covering all the various regions of fact being viewed "synoptically".

In both these cases (of speculative and synoptic thinking as here defined) the language employed is of necessity highly metaphorical. For descriptions of "the whole", statements of universal relations, can only be made in terms deriving from particular relations and from the characterisations of particular situations and regions within empirical fact. Thus any literal construction of such orders of expression must lead to "antinomies".

Within the context of the present discussion (as already indicated in the introduction) we are confining ourselves primarily to the synoptic type of philosophy, although bearing in mind that the distinction was not intended to indicate two completely different kinds of undertaking, but to describe two aspects of philosophy, applying the adjectives "speculative" or "synoptic" where one or other of these predominates. Likewise attention is chiefly paid to the stage of synopsis itself rather than to its end-term "synthesis", since the latter is clearly less distinguishable from "speculation", the status and validity of which raises wider issues than those with which we are directly concerned.

The metaphorical character of its statements is clearly indicated by the way in which such synoptic thinking is
usually carried out. Some feature of apparent significance within a particular region of fact may lead a philosopher to seek analogies between this and other regions, as a result of which he discovers it to be no less characteristic and important within them. Generalising this feature, and deriving from it some abstract principle, he may use it as the basis of more far reaching "experiments in co-ordination", as it were. Ascertainment of its ever-broadening adequacy may become the foundation of a "judgement of importance", which perceives in this feature a "key concept" in terms of which it is possible to interpret and significantly relate the whole disconnected series of events within reality.

This search for order and unity, as earlier pointed out, may take place at different levels - at first within a particular region of fact, and then at a level beyond whereby several such regions are connected. Whatever the stage of generality, however, metaphysical thinking in this sense is always analogical thinking; it attempts to clarify by

* The paragraphs following (indeed the main orientation of this chapter) are clearly much indebted to Professor Emmett's detailed examination of the use of analogy within philosophy. Whilst having no new contribution to make to this question, somewhat detailed reference is made to her suggestions because they seem best to convey the first point of relationship between metaphorical expression and synoptic philosophy indicated at the close of the preceding chapter. For the systematic development of analogy constitutes an important means whereby synoptic co-ordination is
means of analogies drawn from reflection upon one order of "being" which one is best acquainted with, or judges to be of primary significance, the nature of other aspects of being and experience. To examine the differences as well as the similarities between this and certain prominent non-philosophical forms of analogy, (in addition to those of poetry already touched upon) may clarify the distinctive use within philosophical systems of this fundamentally metaphorical order of statement to provide a sustained interpretation of events.

The first and most obvious non-philosophical usage is provided by the metaphors of popular literary and everyday speech. The analogies developed here may be particularly misleading owing to the failure to distinguish between their employment as arguments, or as illustrations. They are frequently advanced as though affording an all-sufficient rational "explanation" of the events thus indicated. A popular case in point is that of everyday speech concerning "will-power". People sometimes speak as though there were a dynamo within man, or a government issuing orders, which explains our overt actions. By speaking of a man and his "will", they render themselves easy prey to achieved; whilst, at the same time, not only do the resultant "insights" demand expression in highly metaphorical language, but also the drawing of the initial analogy is itself a special case of metaphorical thinking.
"Occam's Razor" as wielded by the formal logician or behaviourist psychologist against those who hypostatise entities in the manner of "the poor ignorant peasant who thinks there really is a horse inside the railway engine".

The misleadingness of such popular forms of speech, however, is clearly of a different order from that of inadequate philosophic analogies. There is a distinction between the above form of pseudo-explanation achieved by attaching a "label", and the insufficiency of a descriptive analogy invoked by philosophers. It is a mistake to allow popular misuses of analogy to cast universal doubt upon its validity, even when the insufficiency of the philosophical analogy suggests that its inventor is, as Collingwood says of Leibniz in regard to his doctrine of "pre-established harmony", merely christening his problem with a long name. (Even the latter procedure is, of course, no mean achievement, in as much as philosophic perspicacity consists to a large degree in just such ability to see and elucidate what the problems are)

Secondly there is the use of analogy within the natural sciences to suggest new lines of enquiry. The distinctive feature of this form is that both terms refer to a circumscribed area of reality, and the events related are of homogeneous type. Inductive argument does not start from a mere accumulation of facts, of instances of natural
occurrences, but from the perception of certain resemblances between them. This detection of significant resemblances leads ultimately to the postulation of some universal law to account for them. Two aspects of scientific reasoning from analogy are of particular relevance to philosophy, and to the understanding of the differential character of the use of analogy within the latter.

First, it is to be noted that mere apprehension of resemblance alone does not afford sufficient basis for scientific analogy, for it may, in some cases, be misleading rather than fruitfully suggestive. What constitutes a "striking" resemblance clearly depends upon the previous knowledge and mental outlook determining one's general expectations. One may sometimes be impressed by a weak analogy because a resemblance which is interesting, or emotionally satisfying, seems to be important. Science, however, is concerned to determine relevant resemblances. Darwin's theory of Natural Selection, and Laplace's Nebular Hypothesis are both classic examples of scientific theories suggested by an analogy based upon an unexplained resemblance, too striking in relevant particulars to be regarded as accidental.

It appears, then, that the main characteristics upon which the strength of analogical argument in science depends are (a) the character of the initial resemblance —
that it should relate to **important** and relatively comprehensive properties; and (b) that the inference should be to **restricted** properties. That is, the more comprehensive the inferred properties in comparison with the positive analogy, the less likely is the conclusion to be justified. Legitimate argument from analogy in science, in short, depends upon seeking to increase the comprehensiveness of the implying properties, and of decreasing that of those implied. And this is a reversal of the procedure of attaining philosophical generality.

In the second place, scientific analogies point out hypotheses which can be further tested in experience. The reasoning of inductive science proceeds from one term within experience to another term also within experience. That is to say, both are observable in principle. Science does, of course, work with unobservable concepts - its general principles, and hypothetical models - but these entail propositions concerning events which can be observed. That this is not the case with philosophical principles, on the other hand, derives from the most fundamental differentia of these two branches of knowledge, namely, that whereas scientific analogies refer to a limited section of experience, those of philosophy are used for interpreting the whole. It is in this sense that metaphysical analogies are unique, and that the terms between which some likeness
of relation is suggested belong to different orders. The "analogue" is not even verifiable in principle.

The third kind of analogy to be distinguished is that of mathematics or exact science. Here, argument proceeds on the lines that given three terms and a proportion, it is possible to determine the fourth term exactly. For example, given $3:9; 6:x$, we know with certainty that $x$ equals 18. As Kant pointed out, philosophic analogies differ from those in mathematics in that they are concerned not with quantities but with qualitative relations. In philosophy, accordingly, knowledge of the relation to the fourth term no longer suffices to indicate the precise nature of this term itself, since it is not merely a quantity, but only affords a rule for seeking it; such a priori knowledge gives "regulative" but not "constitutive" principles.

Thus, although philosophical analogies are based upon more far-reaching similarities than those of everyday or popular literary speech, they are not of either the strictly mathematical or inductive order. They constitute rather a "sideways" movement of thought endeavouring to embrace a large body of matter within a single scheme, and so attain a synoptic view thereof. Being concerned with "total assertions", philosophic analogies are employed to enable thought to make this jump from part to whole. Synoptic thinking thus becomes more than merely "holding together"
various aspects of experience; it becomes a process of extrapolation, of drawing analogies from what has seemed most significant or important within experience in order to illuminate and provide an interpretation of the nature of reality as a whole.

Its value is not, however, exhausted by this ability to furnish a general interpretation of the universe as a whole; more significantly, the particular analogies selected afford distinctive methods with which to approach the solution of specific philosophical problems.

Aristotle’s concept of Matter and Form is a prominent example of this. The notion of moulding pre-existing materials into a certain determinate shape is familiar in everyday life, and suggests a possible way of interpreting other events in human life, or facts of nature, which bear analogous features. Impressed by the fact of change, of "becoming" in biological phenomena particularly, Aristotle, for example, drew attention to the evident analogy between this relation of potentiality and actuality, and that of artifact to artificer. The fact of change in itself always constituted a problem for the Greeks. Analogies, therefore, drawn from immediately comprehensible facts such as human artistry and construction are obvious aids to "rationalising" what was less understandable. Interpreted less statically and mathematically, Platonic metaphors were already to hand
to confirm - and be elaborated into - Aristotle's interpretive categories of Matter and Form whose application might help to achieve this.

The methodical value of this approach has been given a more recent illustration within other contexts by Stocks, who illuminates some of the difficulties of Communism and Democracy alike, by means of the Aristotelian analogy. Both, in so far as they tend to overstate their case, are examples of what he calls "materialism in politics", giving to the term "materialism" not the connotation acquired in the context of 17th century two-substance theories, but the more illuminating definition as a general theory concerning the genesis and organisation of complexes, which is nearer the sense given by Plato and Aristotle in their opposition to current Greek materialism, (the latter regarding the operative principle of events to reside in the pre-existing materials, not the form). Each of the above-mentioned political doctrines, according to Stocks, mistakenly depends upon a belief that materials are competent to provide their own form. The more extreme theories of "popular democracy" tend to overlook the fact that democracy is a form of government; they stress the matter of the commonwealth, which is the lives of its citizens, at the expense of the formative element of government, and so conduce to anarchy (and ultimately to the other extreme, totalitarianism).
Similarly Marx over-emphasised the originative impulse of material forces (economical means of production) at the expense of the human will acting in accordance with directives proceeding from man's social conscience and judgements of values.

The above examples illustrate the fact that, whilst philosophical analogies must not (any more than those of popular speech) be over-pressed into the status of literal explanations, they can be decidedly "illuminating", and help to clarify some of the factors involved in a specific problem in relating it to others in such a way as to shed a new light upon it.

Philosophers have, of course, not confined their "metaphorical thinking" to this type of "co-ordinating analogy". They have traditionally claimed to do more than "illuminate"; in addition to clarifying specific problems, or rendering the world "intelligible" they have professed to discover what is "real". Thus the final example given by Emmett in her classification of five senses in which philosophy may be said to involve analogical thinking, is of what she terms "existential analogies". That is, attempts to express in concepts drawn from intra-experiential relations, a relation to an object in part experienced and in part not experienced; a relation to "transcendent" reality, where "transcendent" means that which is other than, but
not totally unrelated to and beyond any possible experiences. Such analogies, she points out, represent indirect attempts to say something about "being" itself, through our judgements concerning the relationships in which we find ourselves. This claim, however, falls rather under the heading of what we classified as predominantly "speculative" philosophies, and as such does not come under direct consideration within this context.

Our immediate concern, therefore, is with the advantages and disadvantages, services and disservices, of philosophical systems constructed upon the basis of one or more "co-ordinating analogies". Although we have emphasised the need for synopsis and synthesis, for selective "judgements of importance", the dangers involved in this type of thinking cannot be overlooked or easily escaped. There is always a tendency to distort those aspects of reality which do not easily "fit in" with the preconceived "unity pattern"; or alternatively, to make the synthesising principle so vague and eventually tautological, that it fits everything at the cost of illuminating nothing. The important thing, therefore, is to understand the nature of this aspect of the "metaphysical abstraction". For, as Broad succinctly puts it,

"The speculative * philosopher and the scientific

* His use of the term here is close to our more cautiously restricted epithet "synoptic".
specialist are liable to two opposite mistakes. The former tends to deliver frontal attacks upon Reality as a whole, armed only with a few wide general principles, and to neglect to isolate and master in detail particular problems. The latter tends to forget that he has violently abstracted one part or one aspect of Reality from the rest, and to imagine that the success this abstraction has given him within a limited field justifies him in taking the principles which hold therein as the whole truth about the whole world. The one cannot see the trees for the wood, and the other cannot see the wood for the trees."

(The Mind and Its Place in Nature. p. 5.)

As in the case of the first aspect of "metaphysical abstraction" concerned with limitations of inherited terminology, unwarrantedly extreme conclusions regarding systematic philosophy as such have been drawn from the existence of such difficulties. It is helpful, therefore, to adopt here a similar procedure, considering the main lines of criticism usually presented, in order to estimate their chief value and relevance to this thesis.

The first, and most obvious, is that of its "subjectivity". You admit, the criticism runs, that the philosophical system thus constructed is based upon a selective judgement of significance. Consequently it involves "interpretation" of the data by the philosopher from his own personal point of view. Yet philosophical systems claim to be indicative of objective truth. Does not the fact that there are as many systems as philosophers support the suspicion, which the frequent imprecision of their language and method alone engenders, that the analogical
Descriptions in which metaphysics indulges are simply matters of taste? What one man thinks to be "important" at one time, may appear totally irrelevant to another.

Clearly this is the most fundamental criticism, and one from which all others largely stem. It seems to involve saying that the synoptic thinking cultivated by a philosopher precisely in order to achieve some degree of impartiality and openness to all the fields investigated by particular disciplines, in fact condemns him to irremediable partiality. The metaphysician has claimed to be concerned with the distinctive problems unamenable to the "yardstick" of sciences dealing with problems to which there are "right answers" discoverable by specialised methods, only to use similarly limiting ideas within his own sphere.

To this, it must first be remarked that selective "judgements of importance" introduce order and form into what would otherwise be simply a chaotic mass of experiences: it imposes a "perspective" without which, as Emmett points out, we are presented with at best a dead level catalogue

---

* The claim made by some philosophers to "standpointlessness" (e.g. Wisdom in "Philosophical Perplexity." Proc. Arist. Soc. 1936-7) therefore, does not seem ultimately tenable, although it is, of course, a salutary corrective to pernicious attempts to restrict knowledge to some one fixed pattern. On the contrary, as Whitehead insists, "this sense of importance is embedded in the very being of animal experience. As it sinks in dominance, experience trivialises and verges towards nothingness."

Modes of Thought. Chapter I.
of facts.

"A judgement of what is important brings form into multiplicity whether in presenting an intellectual theme, or in the practical conduct of life. There is, of course, always the danger that it may impose preconceptions: but a preconception can at least sustain interest and later be corrected, whereas a mere manifold of undigested matter of fact can tell us nothing."

(The Nature of Metaphysical Thinking.)

Admittedly, then, no metaphysical theory can be more than highly selective, but can only aspire to afford some revealing co-ordination. And whilst, moreover, (as Emmett elsewhere points out) this selectivity does mean that different philosophic analogies are likely to commend themselves at different epochs, this does not alter their value any more than a subsequent abandonment of such a theory when its relevance is diminished, disproves it.

The objector may, however, point out that although all thought and activity is selective, the problems created within philosophy are more pressing. The approach of scientist and philosopher to their respective problems is similar in this respect: in order to achieve any result, both must know what kind of question they are asking and

* This she later compares to a Fougasse cartoon - "Fougasse can convey certain important characteristics of a subject through a very few lines - the tilt of an eyelid, perhaps, or the curve of a neck. There is distortion; there is a high degree of selectivity; there is certainly the artist's personal way of seeing; yet the result conveys an important character of the situation."

Ibid.
what kind of evidence would be taken as giving an adequate answer. But the scientist is, according to the field of science in which he is working, certain of a number of general propositions concerning what constitutes valid evidence within that field. That is, the presuppositions involved in any particular scientific investigation consist of a set of general propositions about the subject matter concerned, upon which there is a degree of consensus of expert opinion embodied in the existing structure of laws and theories. Ex hypothesi the philosopher, on the other hand, does not have this degree of assurance as to what constitutes valid evidence. Consequently, his presuppositions are more likely to be subjective, or at least localised to the general tenor of his Age than are those of the scientist who can depend upon a certain background of universal agreement. Correlatively, his awareness of them (and of the ways in which they are affecting his judgements in selection and employment of analogies) may be less acute, on account of their all-pervading, universal character; it is obviously difficult to elicit that which never fails of exemplification. In short, the problems involved in any "abstraction" are rendered more acute in philosophy because they are more difficult to recognise, since they do not operate in a circumscribed sphere, but insinuate themselves into the whole of his thinking.
This is a serious difficulty, but to over-emphasise it is to overlook certain other important features of philosophy.

In the first place, an individual philosopher's selective judgement of what is significant is not merely his personal reaction to the world. This is where analogies with poetry, for example, may be misleading. The philosopher professes to give reasons for his selection. Thus his reaction is, as Emmett puts it, "immediacy after reflection", rather than the immediacy of the artist. He must take into account, critically correlate and clarify, various forms of thought and experience, at the same time paying attention to the work done by earlier, as well as contemporary philosophers, thus to some extent incorporating their judgements and reflections upon these within his own. (The need to avoid the second type of "vertical" abstraction distinguished within philosophy (viz. p. 51 et seq.) becomes of direct relevance here.

Secondly, although the "total assertions" of philosophy can never be proved or completely justified in experience, constant return to empirical evidence, to other branches of knowledge and various types of immediate "response" to the world, serves to regulate their formulation.

Thirdly, the very attempts to achieve some measure of comprehensiveness constitute some check upon merely
subjective impressions. This point is often overlooked by those whose derision of metaphysicians generally extends particularly to the "system builders".

The second main line of criticism frequently brought against this philosophic "abstraction" is against the idea of "system" itself. A metaphysician's "system" is the elaboration and ordering of his analogy, a pursuit of its ramifications and implications in all spheres of experience. Thus the question concerning the justification of this procedure, which involves to a greater degree the potential dangers of the other forms of abstraction earlier discussed, would seem to have particular significance for systematic philosophy. Although many factors may be cited as "inclining" evidence for some "total judgement", the latter itself expresses more than a strict logical inference from these. There is an inevitable "gap" between the evidence itself, the "reasons" given, and the total assertion, as a result of which no proof is possible, but only "sheer disclosure".

It is, however, precisely the justification of taking a "jump" from evidence to theory which presents the problem. The strict logician can quite obviously question the rationality of this procedure. Is it being claimed, he might ask, that in metaphysics there is a form of inference which is rational and yet differs radically from the
strictly deductive or inductive procedures of science, elaborated in traditional logic? Or have we in fact, he suspects, left the realm of philosophy and intelligible discourse for a sphere in which the only criterion applicable is one of "aesthetic fittingness"; and the only mental attitude required is that of the man prepared to abandon reasoning and make an existentialist "leap of faith"?

This difficulty may perhaps best be approached by referring again to the notion of "appropriateness" in respect of metaphysical analogies. As mentioned earlier, discipline by other forms of thought and research will enable the philosopher to refine and sift the analogies which suggest themselves, retaining only the more illuminating. This reflective procedure renders them infinitely superior to those of popular usage. On the other hand, if "appropriateness" is the prime consideration, would it not appear that "free existential description" is the more rational procedure, and one which any attempt to construct a philosophical system on the basis of a selected analogy or analogies must vitiate? If the chief immediate end towards which the philosopher's use of analogy is directed be that of "illuminating", or interpreting a particular set of phenomena, is it not folly for him to tie his hands to one analogy in the interest of "system", and would it not be better for him to leave himself free to choose the "fitting" analogies in
each situation as it arises? Does not the ideal of systematic development of a single co-ordinating analogy do violence to the diversity of philosophical problems by asserting connections between what are better dealt with as independent problems, each to be considered on its merits and solved by methods appropriate to itself?

Systematic metaphysics must indeed inevitably sacrifice something in the matter of appropriateness to any specific problem being expressed. Any such loss of immediate appropriateness is, however, more than compensated in fullness of analogical overtones. Although analogies must not be applied with the "yardstick" uniformity of science, but to some extent broken down and interpreted and modified to suit the several spheres of their application, the over-all analogy must at the same time be maintained. For this provides the co-ordinating thread of the totality of a philosopher's experience, in virtue of which one aspect thereof is enabled to lend significance to another. The unity lent by "system" in this sense is of paramount importance if a philosophy is not to lapse into an aggregate of ad hoc hypotheses, and a man's life is not to dissolve into a confused bombardment of isolated experiences from which he stands to learn nothing which may enrich his future experiences, or contribute towards the integrated and full personality which moral decision itself seems to
Having considered some of the difficulties involved in the systematic development of co-ordinating analogies here described, we may conclude with a brief general indication of their out-standing advantages. Not the least of these is the corrective which, it was earlier suggested, they afford to the other aspect of what was termed "metaphysical abstraction", the influence of inherited concepts upon the philosophic thought of a particular time and place - an influence rendered the more potent by the inevitable metaphorical extension of words from the contexts in which alone they have literal significance.

The general ideas expressed by abstract words (or "concrete" words used in an "abstract" sense) may be uncritically transferred from one "family of propositions" (to employ Ryle's useful phrase) to a radically different context, so introducing errors of "type", of the categories to which such concepts (with all their implications) rightly belong; errors which have historically been in no small degree responsible for many philosophical "puzzles" and "paradoxes". That is to say, "concepts" derive their initial "powers" from the propositions from which they are, as Ryle reminds us, in fact "abstractions"; consequently

* Here, it may be noted, lies a self-contradiction of an extreme Existentialist position.
"the risk always exists that confusion or paradox will arise in the course of any hitherto untried operations with those ideas." * One important way in which these abstractions can be checked, and counterbalanced, is by bringing them into systematic relationship with other ideas, and so making clearer the implications of their employment and the presuppositions which they may be carrying over unrecognised from the field of knowledge (or the "family" of propositions) in which they originated. To quote Ryle again,

"... The problem (of charting the logical powers of ideas) is not to pinpoint separately the locus of this or that single idea but to determine the cross-bearings of all of a galaxy of ideas belonging to the same or contiguous fields. The problem, that is, is not to anatomize the solitary concept, say, of liberty but to extract its logical powers as these bear on those of law, obedience, responsibility, loyalty, government and the rest. Like a geographical survey a philosophical survey is necessarily synoptic. Philosophical problems cannot be posed or solved piecemeal." (Op. cit. p.11)

Ryle is, of course, here referring to more direct essays in "logical geography" than has been the implication of our discussion. His view nevertheless lends support to the present contention that the "criticism" of such "abstractions" (embodied particularly in abstract words and metaphorical usages) is one important service rendered by the systematic philosophy we have been considering.

Secondly, the more direct epistemological value of the

* Philosophical Argument.
type of metaphysical thinking above described may be suggested. Such systematic development of co-ordinating analogies may claim to be informative in a sense which goes beyond the "illumination" of poetry. Yet the new knowledge given clearly is not such as can be expressed in non-analogical terms. Indeed, the "apprehension" indicated by this mode of thinking may ultimately exceed the strict "comprehension" in terms of the selected analogy: it may indicate an object of understanding lying beyond all attempts to circumscribe it in analogical thought. This is suggested by the characteristic procedure of Plato, for instance or of Spinoza. It is notable that Plato completes his preceding analogies of the Sun and the Line with a "myth" (the Cave), whose symbolism is more adequate than any direct, descriptive representation, to present the ultimate "insight" he wishes to convey— an insight which, it may be remarked, is of moral as well as epistemological significance. Similarly, Spinoza's theoretical and practical concerns become integrated in a state of knowledge which, however literally "real" to him, can only be fully represented (with its full complement of emotional and intellectual insight) in a semi-mythical description of the "state of blessedness" pertaining to the "intellectual love of God". As Alexander says of Spinoza's change to scientific intuitive — it is as if knowledge, instead of being described
in sober prose, were exposed in a poetic picture after the work of reflection was done.

In short, Plato and Spinoza alike here reaffirm the "uniqueness" of the final knowledge, which defies adequate description in terms of the universals of language, the application of which depends upon the perception of similarities and identities.

It may be asked, however, whether the somewhat vague "insight" afforded can strictly be called knowledge. Obviously in the sense of factual information it cannot. It has, however, important epistemological significance in that it clarifies previous knowledge: that is, it affords a new knowledge of reality in the Socratic sense of bringing — by the attempt at expression — clearer knowledge of what was previously, although in a confused and indefinite sense, already known. No less important, as Emmett points out, moreover, is the better understanding attained, through this conscious articulation, of the experience from which the analogy has been drawn. This is so particularly in respect of its limitations. For by exploring "reality" in terms of its interpretative categories, and exhibiting its potentialities on the grandest scale, a philosopher may open the eyes of others (as well as his own) to its inadequacies.

The selection of "co-ordinating analogies" on these
grounds, seems to us, therefore, an abstraction which must be made, both for the sake of helping to render more explicit the presuppositions embodied in the terminology and ways of thinking of each Age and for imposing the perspective required for the conscious clarification of experience and other more specialised forms of knowledge. No single analogy is to be regarded as the ultimate "true" one - the question of truth or falsity asked in respect of metaphysical systems in this sense would seem to be misplaced. For a philosophy must to some extent arise by objective necessity out of its author's situation, and in connection with the immediate problems with which he is confronted. (This is particularly evident in political philosophies.) And since the problem and situation are in a large degree unique, one philosopher's system cannot be accepted without modification by another. What is permanent and essential is not any particular system, but the necessity of thinking systematically. Nevertheless, where dogmatic claims for finality are in fact made, the history of philosophy to some extent corrects the selectivity of this philosophical abstraction, and thus of itself affords a "critique of abstractions".

It is sometimes suggested that the ability to discover "final truths" about reality is, nevertheless, demanded of philosophy if in any sense it can be said to correct the
"partial" approaches to knowledge characteristic of particular disciplines. According to this point of view, abstractions and hypotheses cannot be criticised except from a basis which is in itself neither abstract nor hypothetical; thus, unless philosophy can make judgements that are concrete and categorical, it has no claim whatever to criticise the procedure of science and similar specialisations.

The foregoing discussion has reflected our doubt whether philosophy can make such judgements, whether it can ever discover an ultimate concrete "truth" or fact, such as the Cartesian Cogito or ego, upon which to base its deductions; but this question apart, the present contention is that it is unnecessary. The error of the above argument is parallel to that involved in the belief that one cannot legitimately criticise existing codes of morality, forms of political and social behaviour, etc. without some insight into an "absolute standard" by reference to which their deficiencies are made apparent. To perceive error in this view is not to deny categorically the possible existence of, or value of the belief in, "absolute standards" in some sense (at least, as "regulative" if not "constitutive" ideas) - this is a question, which, like the above, we may here leave open; it is simply to question its necessity for the purposes of making such criticism.
The historical illustrations of the following chapters are intended, therefore, in the first place to support the belief that, despite the inevitable abstractions which it has been shown to involve, systematic philosophy can significantly provide a "critique of abstractions" in respect of the method and terminology of more specialised and partial modes of study. The discussion will include indication of the "self-criticism" of philosophy itself. The latter phrase has a somewhat Hegelian "flavour"; but the form of criticism here envisaged proceeds by no internal necessity born of a hypostatized conception of the "logic" of history. It is simply the essential correlative aspect of the above-mentioned form of philosophical criticism.

The selection of near-contemporary "Rationalists" as our historical examples serves to indicate further the dissociation of this conception of philosophy's main function and value from the grandiose scale of the Hegelian view. The term Rationalist, itself somewhat misleading, is here being strictly confined to denoting a pattern of thinking constructed basically on analogy with mathematics. Philosophers' use of analogy may be discussed in diverse ways and at various levels. The following Section will consider not so much the synoptic "world views" which result from elaborations of mathematical analogies, but the reflection of this "unity pattern" upon conceptions of method, and
upon the metaphysical categories in general employment. The discussion of the more general implications of the basic Rationalist analogy, and some of the advantages and disadvantages of this method of co-ordination, will be followed by their illustration within a context differing in important respects from that from which the analogue was taken - the context of political theory.

Finally the differences and similarities between divergent interpretations of "mathematical method" will be compared, suggesting some of the ways in which each indicates the limitations of, and supplements, the "abstraction" of the others. "The procedure of rationalism is the discussion of analogy. The limitation of rationalism the inescapable diversity," wrote Whitehead. That this is so, and has historically been recognised and corrected by the modus operandi of the subject, is undoubtedly exemplified in the philosophy of "the century of genius".

0-0-0-0
SECTION II
THE RATIONALIST ABSTRACTION
IN THE
SEVENTEENTH CENTURY

CHAPTER V
"WAYS OF KNOWING" IN SCIENCE AND PHILOSOPHY.

The search for certainty, in one form or another, has been an age-long quest within philosophy. The claim of mathematics to have attained, within its sphere, this epistememological ideal has constituted, from the time of Plato onwards, perhaps its chief attraction to philosophers. The certainty pertaining to rigorously deduced mathematical propositions provided the inspiration to construct a basic "pattern" of knowledge on analogy with this creation of the "divine madness of the human spirit". It is with the general features deriving from this mathematical analogy of rational activity that the present Section is concerned, comparing its manifestations within the philosophy and science of the 17th century, and then illustrating its effects within a field dealing with human relationships - political philosophy.
Rationalism has two forms, both of which proceed from the primary quest for certainty: they may be referred to as its "weak" and "strong" forms respectively. The first consists in a faith in the omnipotence of method, in its ability to achieve anything: a faith which led to the exaggeration of the importance of formulated rules for knowledge of any kind. The second goes further, and asserts that the method is a priori. In one or other of these forms (of which we will take Bacon and Descartes respectively as representative examples, hereafter referring to them for convenience as "Baconian" and "Cartesian" Rationalism) it may be said that Rationalism was the defining characteristic of philosophy in the 17th century. "For to be possessed of a vigorous mind is not enough:" wrote Descartes, "the prime requisite is rightly to apply it." Despite many other fundamental divergences it became, at this epoch, almost an article of faith that a methodical discipline of thought could solve most, if not all, of man's practical and theoretical difficulties.

Our primary concern is with the second, the "strong" form of Rationalism. It is, nevertheless, instructive to give some brief consideration to the first, in regard to those features particularly which contributed to the direction of general Rationalist tendencies, as they affected science and philosophy alike. The "Baconian Rationalism", 
far from being opposed to empiricism may, as the epithet suggests, be combined with a strong belief in the all-importance of experience. Notwithstanding it provoked certain general trends of thought and practice which were to have far-reaching influence. Of these three may be selected as of special significance.

The neglect of the rôle of individual inspiration in obtaining new knowledge is almost inevitably attendant upon a consummate faith in technique. Bacon is confident that "the particular phenomena of the arts and sciences are, in reality, but as a handful: the invention of all causes and sciences would be but the labour of a few years." This "invention" depends only upon the "right method" which, in terms closely resembling those of Descartes, he compares to a pair of compasses, by the use of which a quite unskilled person can be sure of drawing a more perfect circle than the best artist can draw without one. Thus, although himself rather an unsystematic experimenter who breaks all his own rules, Bacon laid down in detail the ways in which scientific experiment might be improved and perfected. The right method of research would, according to him, be a sort of "inductive machine", whose employment would inevitably lead to useful discoveries irrespective of the intellectual differences of those making use of it.

In actual practice, of course, however much influenced
by Bacon's detailed account of inductive methods, the prominent scientists of the century depended far more upon individual inspiration than upon a technique which "places all wits and understandings nearly on a level." According to one authority on the subject, the absence of a formulated method of research, indeed, of any seemingly very clear idea of what they were doing, was a conspicuous feature of the scientific movement as a whole at this time. (Burtt) The emphasis upon method as far as science was concerned, therefore, would seem to be one of those "philosopher's fantasies" which convince few within the spheres about whose practice they are supposedly theorising. In parenthesis, it must, however, be noted that despite the all-important part played by Descartes, on the other hand, in the development of this pre-occupation with method, the latter keeps closer to the facts of scientific experience (albeit, it might seem, to some extent at the cost of consistency) when he insists that method can be no quasi-mechanical substitute for intellectual perspicacity, but is simply a propaedeutic to its functioning, by removing the more obvious obstacles and training the natural reason to look in the right direction. Moreover, Descartes expressly warns his readers of the need to "be careful lest our reason should take a holiday while we are examining the truth of anything". (Reg. 10)
As a correlative to this first general tendency of "Baconian Rationalism" appears a second feature which, although diametrically opposed to the more a priori type, had historically a potent influence upon the excesses of the Rationalist-Empiricist opposition. This, the mistrust in the function of hypotheses in science, was notably a defect in Bacon himself, who appears to have confused the error (obviously to be avoided as far as possible) of approaching facts with a prejudice, and the practical necessity of approaching them with a working hypothesis.

Whilst insisting upon the importance of exact experimental verification, the scientists of this century themselves did in fact make considerable use of guiding hypotheses. The probable truth of these for the more mathematically inclined scientists such as Kepler and Galileo depended, of course, upon the adequacy with which they related mathematically the events to which they referred. But even the empiricist Boyle admitted that experience and a priori speculations each have their place.

"Experience is but an assistant to reason, since it doth indeed supply information to the understanding, but the understanding still remains the judge and has the power or right to examine and make use of the testimonies that are presented to it."


* But cf. footnote on page 113.
"Newton's little joke", as it has been called, * has been in no small degree responsible for the underestimation of the use of hypotheses in 17th century scientific practice and thus of furthering the rift between Empiricism and Rationalism. "Whatever is not deduced from the phenomena is to be called an hypothesis;" he insisted, "and hypotheses, whether metaphysical or physical, whether of occult qualities or mechanical, have no place in experimental philosophy." (Principia.) His immediate practical concern was, of course, with experimental laws demonstrable from facts, this (rather than deduction from a priori assumptions) being the proper method of investigating phenomena within the natural world. It is with regard to the cause of the properties of gravity, for instance, that he asserts that he frames no hypotheses. Two special classes of hypotheses are being rejected: metaphysical hypotheses involving occult qualities, on the one hand, and mechanical models in physical science on the other. The first yield definite verifiable expectations and are, therefore, useless for science: the second do not afford sufficient explanations, since it is possible to invent any number of such models which will equally account for the phenomena.

The misunderstanding of the relations between reason and experience in science - and thus of Empiricism and

* Ritchie. Scientific Method.
Rationalism in philosophy - which was nurtured by such theoretical disparagement of hypotheses within experimental science, was partially removed by Kant. Yet, even into the 19th century, induction was usually conceived as a procedure for obtaining a general conclusion from a set of particular observations. Writing in that century, Whewell perhaps did most to point out the importance of the appropriate "colligating concept" and the fruitful working hypothesis. Since then, divers writers in the 20th century have emphasised this as an essential characteristic of scientific method, and so have helped to remove some of the more far-reaching difficulties extending from the original Baconian type of Rationalism in the Rationalist-Empiricist antithesis generally.

The third feature which must here receive mention is common to both types of Rationalism. This is the tendency to underestimate the complexity of nature. As some of his "Aphorisms" indicate, Bacon sometimes supposed that scientific theories could be simply "read off" from the facts. *

* It may be noted, however, that Bacon does sometimes appear to be aware of the difficulty of "reading off" from the facts. Kneale, for instance, points out that he speaks occasionally of trying to find the latent (i.e. observable) configuration of the particles of things and admits that we cannot truly hope to read this off from his tabular statements of the results of observation. "In one place he says that after collecting all the evidence we may rightly let the intellect go its own way in speculation about the hidden form. This doctrine of intellectus permissio is in
And his belief that the whole corpus of scientific knowledge might be completed within a comparatively short time clearly presupposes that the variety of phenomena, the number of possible experiments is limited.

Scientific practice may well lean to some extent upon what Keynes has called the "inductive hypothesis" - the assumption that nature is fundamentally finite (which is stateable in the form of two further assumptions: the Principle of Limited Independent Variety, and the Principle of Atomic Uniformity.) Yet practising scientists even in the 17th century did not underestimate the complexity of nature to the same extent as philosophers in their simplified abstractions. To the latter the physical universe might be simply "a vast cryptogram waiting to be deciphered". To the scientists, on the other hand, it remained a ferment of possibilities. They approached its understanding with the faith that there was an order to be discovered, but at the same time acknowledged the possible extent and complication of natural laws as yet undiscovered. Newton, for example, is non-committal on the subject of the ultimate nature of the universe and the possibility of its total effect an anticipation of the hypothetical method in natural science and a confession that we cannot go far by the use of his tables."

Kneale. Probability and Induction.
explanation. * Whilst even Galileo's conviction that nature was "a book written in the language of mathematics . . ." did not prevent his recognition of the possible infinite complexity of nature; that she "cares nothing whether her reasons and methods of operating be, or be not, understandable by men". **

If, then, this underestimation of the complexity of nature was a philosopher's, rather than a scientist's weakness - an instance of misleading abstraction from the concrete activity being described - it might yet, in one respect at least, be termed felix culpa. For such over-simplifications, born of the general concern with method and the idea of system in knowledge, constituted a significant "criticism" of the limitations of previous approaches to knowledge, as manifest particularly in both practical and theoretical trends of Renaissance life and writings.

The critical function of philosophy is not confined to abstract systems of logic and specialised sciences, or other academic disciplines, but is of particular importance in bringing to light the defects of the more general features

* The spirit of the preface to the Principia is rather that - "the world is what it is; so far as exact mathematical laws can be discovered in it, well and good; so far as not, we must seek to expand our mathematics or resign ourselves to some other less certain method."


of an age and society contained within the term "culture". This aspect, to which little attention has generally been paid, has been emphasised by a recent writer.

"The philosopher's chief task is, I believe, the criticism of contemporary culture, a task which includes logic and epistemology as the criticism of the methods and claims of the sciences, but which includes much else besides - the criticism of art, morality and institutions, and, in the Socratic spirit, of every specialism, theoretical or practical, that claims to be more than the abstraction which in fact it is."

(McCracken. Thinking and Valuing. p. 8.)

In regard to the amelioration of existing institutions, the examination of decaying ones, and similar social requirements, philosophy is perhaps the most effective of intellectual pursuits. For although its working may be slow, in so far as ideas may remain dormant and unused for years, its effects within society are undeniable - philosophic ideas eventually become embodied in institutions, and their implications explored in practice.

The existent culture forming the legacy of the Renaissance, the context in which 17th century thinkers found themselves, has been characterised by the terms "romantic naturalism, humanism, mysticism, pluralism, aestheticism and eclecticism ..." (McCracken.) Whatever the justice of all these labels, it seems at least undeniable that the new emphasis upon method and a systematic approach to knowledge was to some extent a reaction against the Renaissance emphasis upon the infinite diversity and complexity of both nature and
human nature. There was an urgent need for simplification, for some principle of unity whereby men could cope with the multifarious detail presented to their understanding by expanding conceptions of the world. Whatever the difficulties of oversimplification to which it subsequently led, the "spell" which mathematics cast over most 17th century philosophers, can be understood in this light. The lack of system, of method, of genuine understanding and unity of outlook amidst a welter of "information" needed some direct remedy. And this remedy, for the Rationalist philosopher, was to hand in the form of a method paramountly exhibited in mathematics.

This reflection leads into the consideration of the second form of Rationalism, with which we are more directly concerned. The term is more thoroughly applicable here, there being added a second most significant feature of mathematically certain knowledge: its a priori character. The emphasis upon the a priori in all knowledge worthy of the name, a consistent feature of Rationalism throughout its varied career, was re-asserted by Descartes on the basis of a conviction born of practical discoveries in his own

* It is noteworthy that this movement was primarily continental. In the British Isles the reaction to Renaissance Romanticism seems to have been less in the form of a philosophical credo than in its practical parallel (which Whitehead somewhere draws) - that of Puritanism.
mathematical researches. The measure of non-controversial knowledge achieved by mathematics had ever surprised him that "no greater superstructure had been raised upon foundations so firm". (Discourse.) The first obstacle encountered in his self-appointed task of formulating explicitly the methods of practicing mathematicians lay in the absence of any such single method. Believing that the differences between arithmetic and algebra, on the one hand, and geometry on the other, could not be ultimate, and seeing that mathematical inferences depended upon purely formal relationships, Descartes succeeded in resolving these differences in the discovery of analytical geometry. It was not unnatural that, as Gilson * puts it, "the strong wine of intellectual enthusiasm went to his head"; that this discovery of a method in geometry which would solve the most complicated problems should deepen his hope that the whole realm of physics might eventually be reduced to geometrical properties alone, or, indeed, that all knowledge is of the same kind, every truth susceptible of the certitude of mathematical proof.

The certainty of mathematics, Descartes saw, depended upon its a priori character. Thus the defect of the older philosophy and science was not, as Bacon thought, that they paid too little attention to experience. On the contrary,

* The Unity of Philosophical Experience.
a naive acceptance of the superficial data of everyday experience had blinded them to the possibility of extending the bounds of human knowledge, which mathematics afforded. Mathematics is applicable only to quantity, the measurable aspects of the world. It is, therefore, fatal for the achievement of knowledge to confuse the quantitative and qualitative aspects of experience; the world of extension, which is clear and distinct must not be confused with the world of colour, temperature, sound, etc., about which we cannot possibly have the same intellectually clear knowledge.

Descartes did not ignore the rôle of sense experience. Indeed Laporte,* in his detailed discussion of the extent to which Descartes was a Rationalist, has concluded that he rather merits the term "empiricist". Kemp Smith, in his newly published work on Descartes follows Laporte in giving an interpretation of Descartes which emphasises more than is customary the important parts played by sense experience, perception, imagination, etc., in his epistemology. Such considerations do at least reveal the superficiality of hasty judgements concerning his a priorism. Nevertheless, when Descartes speaks of true philosophic knowledge, which is by definition certain knowledge, the a priori is of greater importance, empirical data yielding

---

* Le Rationalisme de Descartes.
but probable belief. His chief insistence is that one knows *a priori* that every natural phenomenon is capable of mechanical explanation. This is the only intelligible explanation. It is also possible to prove *a priori* the fundamental laws of motion. Thus, although experience is in accord with them, it is incorrect to base them upon experience.

Comparing this philosophic account with the attitude and concrete practice of the scientists themselves, a similar *a priori* conviction of the fundamentally mathematical basis of the universe may, it is true, be found in the writing of Kepler and Galileo. Basing himself on a belief in the regular and completely necessary character of the processes of nature, the latter contrasts natural science, on the one hand, with law and the humanities on the other, in respect of the certainly true conclusions of the former, which are not dependent upon human judgement. Nature "... doth not that by many things which may be done by few", and acts "... through immutable laws which she never transgresses." *Moreover in some passages, Galileo, too, seems to suggest that this rigorous necessity in nature, deriving from her mathematical character, renders scientific method far more dependent upon mathematical demonstration, upon the *a priori* than upon experiment.* Elsewhere, on the

* Letter to the Grand Duchess Christiana.*
other hand, he stresses the futility of arguing about nature on the basis of general principles alone. Moreover, his emphatic empiricism was to a great extent responsible for the diminishing respect for Aristotelian authority which became characteristic in the 17th century. In short, even the most mathematically inclined of the scientists did not on that account emphasise the a priori at the expense of experience, but insisted upon the need for their proper combination. Nevertheless despite their practical combination of Rationalism and Empiricism, they did lend support to assumptions which were to feature significantly in the general outlook of philosophical Rationalism. Notably, we may mention some of the important effects upon scientific and philosophic categories, and from this upon the conception of knowledge generally, which the mathematically inspired ideal of certainty created.

In the first place, it suggests a perfectly definite and limited conception of the proper objects of knowledge. Certain knowledge must be of the quantitative characteristics of things. Kepler, for example, writes,

"There are, in fact, as I began to say above, not a few principles which are the special property of mathematics, such principles as are discovered by the common light of nature, require no demonstration, and which concern quantities primarily: then they are applied to other things, so far as the latter have something in common with quantities. Now there are more of these principles in mathematics than in other theoretical
132

sciences because of that very characteristic of the
human understanding which seems to be such from the law
of creation, that nothing can be known completely ex-
cept quantities . . .

(Quoted from Opera, by Burtt. Op. cit. p. 57.)

And elsewhere,

"Just as the eye was made to see colours, and the
ear to hear sounds, so the human mind was made to
understand, not whatever you please, but quantity."

(Ibid.)

Although generally speaking the scientists remained
agnostic as to the ultimate constituents of the world,
they thus introduced that scientific abstraction, upon which
so much epistemological debate was to be built by subse-
quent philosophers — namely, that which, along with "Simple
location" contributed to the "Fallacy of Misplaced Concrete-
ness". Kepler's belief that the real qualities of things
are the mathematically measurable, and afford a type of
knowledge totally different from the obscure and confused
qualitative deliveries of the senses, was further develop-
ed by Galileo, who widened the distinction, as between the
"objectivity" of mathematical world of quantitative rela-
tions, on the one hand, and the "subjectivity" of the quali-
tative, non-mathematical world of opinion and illusion on
the other. Thence it passed into the philosophical world
to be elaborated into the notorious doctrine of primary
and secondary qualities. This theory provides a well-known
scientific example of the order of vicious abstraction
created by elevating a practical (methodological) point of view into the status of metaphysical dogma. The result, the picture of Nature as "a dull affair, soundless, scentless, colourless: merely the burying of material endlessly, meaninglessly," is, as Whitehead says, "quite unbelievable." It is a conception of the universe "framed in terms of high abstractions, and the paradox only arises because we have mistaken our abstraction for concrete realities." *

It was, we said, left to philosophers to draw more rigorously the metaphysical conclusions which scientific practice of the 17th century seemed to demand. To elucidate in this way just what are the presuppositions of any specialised methodology is an important service. Yet to do this without going further and placing the study clearly within its specific context, and relating it at the same time with other specialised studies and the different "ways of knowing" employed within them, leads to philosophic error. The error in this case assumed no small proportions. The abstraction of primary-secondary qualities has, in effect, constituted a fundamental step towards banishing man from the physical world of nature and to treating him as an effect of the latter. The epistemological - and ethical - problems so created have vividly witnessed to the far-reaching effects such an abstraction may have.

* Science and the Modern World.
The second significant epistemological effect of the mathematical analogy was upon the prominent scientific and philosophic categories of cause and substance, together with associated conceptions of the nature of true "explanation". "Cause", for example, being in the nature of a "key concept" used to "round out experience", and to express the results of reflection thereupon, is an outstanding instance of the way in which terms that have acquired a pseudo-technical connotation may exert a potent influence over subsequent thought. The nature of "explanation" (and likewise the criterion of "intelligibility") constitute far-reaching assumptions which the causal category carries over into its subsequent employment. For if "cause" means efficient cause, and all rational explanation is causal in this sense, then teleological accounts of "why" things occur are excluded from rational discourse and "intelligibility" depends upon the ability to discover temporal causal sequences. These philosophic ideas may be compared with the concrete scientific situation by which they have been influenced, in order to see more precisely the nature of the abstraction involved.

A demand for an explanation is usually based on a desire to be rid of a "mystery" — to understand the unknown in terms of the already known. From another point of view, however, "explanation" may be roughly described as
the statement of something in terms of current interests and assumptions. The current interests in the 17th century being the understanding of "how" the motion of particular events came about, the traditional categories of explanation appropriate to expressing and answering the Medieval question of "why" something existed at all, were no longer needed. This did not, however, necessarily indicate the falsehood of the older statements. Although scientific forms of explanation in terms of efficient causality supplied the kind of truth now generally demanded — the kind which would enable them to weigh, measure and control things about them, "to extend more widely the limits of the power and the greatness of man," (Bacon) — some of the scientists themselves recognised that this did not necessarily provide a final metaphysical statement of the nature of things.

Galileo, for instance, makes quite clear where his interests lie, and thus the reasons for his categories. He wishes to know not simply that falling bodies descend with accelerating velocity, but "according to what proportion such acceleration is made." This, he says, despite the extensive philosophic discourses on motion, is a question which was in the past neglected. Having thus made clear his limited interest and purpose, however, he does not base upon this the metaphysical dogma that all causality resides in the ultimate atomic constituents of
nature, and that the idea of God or Final Cause has no place in "rational explanation". For the motions with which the scientist is concerned he regards rather as "secondary causes" of events, of which the primary or ultimate cause lies in some indestructible force, about which he confesses ignorance. Thus he does not use the presuppositions of his immediate scientific concern to oppose theological solutions to more far-reaching metaphysical problems.

The restricted "frame of reference" of his own scientific research was made even clearer by Boyle (to take one more case in point). He drew an explicit distinction between "levels of explanation" which are appropriate to the diverse purposes for which explanation is being sought; a distinction seen, in the first place, as holding between "knowledge" and "practical control of nature". His use of the causal category reflects this distinction. Mechanical explanations are, he insisted, of the utmost importance in science, where men seek to extend their practical control over events in the natural world. Whilst recommending, and himself furthering, this investigation of "how" things work, however, he does not question the validity of final causes in ultimate explanation. He simply insists that to give a quasi-theological account of "why" anything exists is no substitute for an answer to the question of "how" it comes into being and operates, implying at the same time (what is
often overlooked) that the converse is also true.

For its own purposes science may discard final causation as irrelevant. The object of science is not to give a total explanation of things. But on the level of explanation where such is demanded, then it will go beyond mechanism. Teleological explanation is a valid metaphysical category, *— for ultimately there is "the admirable conspiring of the several parts of the universe to the production of particular effects; of all of which it will be difficult to give a satisfactory account without acknowledging an intelligent Author or Disposer of things."


It is unfortunate that these levels, and their appropriate methods have not been universally distinguished. By confusing them, discredit has been brought to each in so far as the one has been stressed as all-sufficient within the other’s proper field. It was important for the progress of modern physics that Boyle was able to confine his teleology to metaphysics. It is, however, also important for the progress of philosophy that it be realised that the categories of scientific explanation are narrowly defined for the sake of restricted purposes. Boyle appears to have

---

* Even Bacon, who rejects the consideration of material, efficient and final causes as useless for science, "holds that the existence of teleology in nature is an obvious fact, and that the investigation of final causes is a perfectly legitimate branch of Natural Philosophy. It has, however, been misplaced: for it belongs to the division of Natural Philosophy which Bacon calls Metaphysics, and not to
recognised more explicitly than many of the scientists and philosophers of his day that they were in fact operating with a one-sided notion of cause from a special and restricted point of view. This point was made clearer by Kant in the Critique of Judgement, where he aims to prove there is no antinomy between the description of phenomena from the point of view of efficient causality, and from that of purpose, of internal organisation and adaptation. The two views cannot contradict each other because, as he points out, each relates to problems in distinct fields.*

The new emphasis of 17th century science was clearly warranted; in an Age following upon the Medieval mis-use of Aristotelian notions, it was essential to scientific progress. The invocation of the Aristotelian "formal cause", for instance, as a principle of explanation had become simply a haven of obscurantism, being understood as the demand to find a "principle" or "essence" - of any sort. Hence Molière's famous comedy. In philosophy, likewise, "formal

that which he calls Physics. Bacon's epigram that 'the research into Final Causes, like a virgin dedicated to God, is barren and produces nothing', has been taken by careless or biased readers to be a condemnation of such research. It is nothing of the kind. It is simply a statement of the obvious fact that there is no art of Applied Teleology as there is an art of Applied Physics."

causes" and "essences" are by Hobbes quite understandably dismissed as "jargon typical of that study which is not properly philosophy . . . but Aristotelian". When "final causes" also are relegated to theology, to the realm of faith rather than reason, matter and motion alone remain as the sole principles of explanation. Cause has special reference to change and movement, and the word is properly used only of an event which makes possible or necessary a subsequent event.

These rejections, although independently made (for reasons of the kind outlined above) are quite evidently supported by the more general desire to adopt the successful pattern of mathematical thinking within all spheres. For in mathematical description the explanation of change is inevitably given in terms of external causes. That is to say, since mathematical symbolism represents things as arrangements of identical elements in space, there is, therefore, nothing within the complex to account for change; its source must, accordingly, be sought externally.

* "The symbolism of mathematical thought forces us to represent all change as determined by an external cause and, therefore, all action as mechanical action.

MacMurray. Interpreting the Universe. p. 76.

This, he points out, indicates the inherent limitation of mathematical thought. "Since whatever is represented through mathematical symbolism must have its activities referred beyond itself, it necessarily presupposes the existence of something which is not and cannot be represented
From this it becomes clear that failure on the part of philosophers to examine and make clear the modification required by scientifically-orientated categories such as "cause", when applied within different contexts may be misleading. Their pre-occupation with mathematical symbolism, for instance, which is unable to represent qualitative differences in objects so described, in addition to lending support to the afore-mentioned scientific abstraction concerning primary and secondary qualities, also confirmed the faith in the universal ability of the method of analysis to afford sufficient explanation of complex events within nature and human nature alike.

True explanations (from this point of view) must be in terms of their simplest parts. Thus it is presupposed that a complex whole is but an aggregate of parts, is finite and devoid of unique individuality. For mathematical analysis presupposes a homogeneous medium. Any factor is adequately accounted for by relating it to its efficient cause - cause and effect being discrete, externally related. Change is always, however apparently qualitative, explicable as merely change of order. Past always determines present - since, as Bergson complained, mathematical thought "spatialises" change, and by failing to "take time seriously" ignores the emergence of what is new, of creation. The radical effects upon philosophical thought of such "causal explanations" is
clearly borne out by, for example, Hobbes' view of the nature of philosophy. The Aristotelian dictum that philosophy was concerned with the knowledge of causes received by him a very different employment. "Cause" is for Hobbes simply the means by which anything comes into being, that which, previous in time, brings about the effect. The relationship between wholes and parts is analytic. Philosophic "reasoning" is consequently concerned with knowledge of the generation of physical effects* and of the logical construction of wholes from parts. It is on this conception that his system is largely founded. The problem of

* Reference perhaps ought to be made at this juncture to the logical significance of Hobbes' view of philosophical reasoning, since, as Cassirer has pointed out, the development of logic in the 17th century is important to the understanding of social thought in that and succeeding centuries. From the dissatisfaction with Scholastic methods of definition, which were useful for classification but not for research, arose a theory of genetic or causal definition. According to this theory, explanations of concepts do not proceed in abstraction from the complex of characteristics in which an element occurs, but by observing the inner law according to which the whole originates. The "causal definition" thus traces the structure of the complex whole to its foundations. Hobbes was the first modern logician to grasp the full significance of such causal definition, seeing in it not merely logical reform, but a transformation of the ideal of philosophical knowledge itself. For by its means, he thought, philosophy could transcend the futilities of Aristotelianity which treated "being" as something static and therefore failed to comprehend either thought or corporeal nature, both being essentially "process". Hobbes' restriction of knowledge to that which develops, philosophic reasoning to cause and effect, is thus bound up with his insights into the potentialities of the new theory of definition in 17th century logic.
political philosophy concerns the composition of "the great Leviathan".

The "relativity" of the notion of explanation is, then, evident: equally so is the need to revise in the light of new data one's modes of explanation, and appropriate conceptions of the ultimate "simples" to which complexes are to be reduced. The error of dogmatism concerning the latter may also be illustrated with reference to 17th century science in connection with the substitution of mathematics for Aristotelian logic as a more promising instrument of discovery.

Galileo's procedure was fruitful because he also took the first general step in hitting on the right line of thought. Whereas Aristotle had regarded the natural state of a system to be "at rest", and accordingly saw the problem as that of understanding the fact of motion of bodies at all, Galileo saw that the state of "rest" was but a particular case of the general statement "either in a state of rest, or uniform motion in a straight line": that the point of importance lay not in the motions of bodies, but in the changes of their motions. Consequently, whilst in Aristotelian dynamics the flying arrow was a complex phenomenon requiring explanation, the fact that a cart stopped when the horse ceased pulling requiring none, in Galileo's thought the situation is reversed. This particular change in
conception of "ultimates" or "simple elements" proved fruitful in the theory of dynamics. Consequently, for the purposes of 17th century scientific knowledge, and operating within a sphere thus clearly and restrictedly defined, the Galilean theory was of greater value. But this does not mean that the "simples" which his methods presuppose, can be metaphysically interpreted to be such in all contexts, with a corresponding universal prescription of the appropriate methods of research and mode of explanation. Indeed, at the level of everyday experience, for instance, Aristotle's "ultimates" are valid, since here all actions do cease unless evidently sustained from the outside. In short, as Russell has pointed out, the distinction between "simple" and "complex" is arbitrary. By "simple", is in fact meant that which one is not going to analyse further: the "ultimate" useful for a particular purpose and in respect of a particular interest. Thus, for instance, Euclid's simples are points and lines, numbers being regarded as complex (ratios), whilst for Descartes the reverse is the case. In this instance both happen to be fruitful methods for the particular purposes of either mathematician.

Although in the preceding paragraphs attention has been directed somewhat exclusively upon the effects of mathematical science upon the causal category, and associated conceptions of "explanation" and criteria of "intelligibility", 
rather than upon that of substance, some brief mention of the latter must also be made. Both categories created and bequeathed to philosophic posterity a mine of problems. The notion of cause itself, for instance, even apart from the problem of the "necessary connection" which was said to relate events, was on Cartesian premises a somewhat difficult one. For the notion of mere transference of a quality is unintelligible: between two completely detached and self-dependent occurrences, it is difficult to see what meaning can be given to the idea of causation between them, since on such a supposition there seems no reason why any quality of one should influence the possession of that quality or others by the other. *

Similarly, the correlative conception of substance raised further problems for subsequent philosophy. A case in point pertains to the question of the sense in which the "self", the human person can be said to be a substance.

For Descartes, the term substance implied, inter alia, that the object to which it was applied could be reduced to properties which could be scientifically investigated and described in mathematical formulae. The applicability to the self of such a scientifically-orientated category was, accordingly, denied by Kant on the grounds that it applied

* Cf. Whitehead's discussion of causality in "Life and Nature." Chicago Lecture, printed in Modes of Thought.
to objects quâ objects of mind only. Both Kant's point and the insistence of Hume before him that identity and substance were not terms univocally applicable to material objects and selves, indicated a truth overlooked by Descartes—that the identity which belongs to the self is not the same identity as that which belongs to an object quâ object. If substance is to retain its narrow and rigid connotation given to it by 17th century science, the self emphatically is not substance, but "subject" (to employ the Hegelian distinction).

Descartes failed to distinguish between two senses of substance—"thinghood" and "selfhood". Whilst both assert identity in the face of the challenge of change, in the one there is analogy with mathematical identity, whereas in the other the identity is that of a "system". The contrast is brought out by taking the example of a crystal, which represents the limit of organisation in the physical world. Its identity may be mathematically or physiochemically determined. So far as the mathematical identity is concerned, it is lacking in just that flexibility and variability, that capacity for vicissitude which is the essence of a system which is a "self". What is quite peculiar to selfhood— and quite inexplicable in terms of substance conceived as quasi-mathematical identity—is its

capacity to withstand (and "internalise") its successive vicissitudes, which in any other structure would be destructive of identity. In short, it is not an identity which excludes change, and is not demolished by, but rather presupposes it as the "self" involves development, its "substantiality" necessarily including potential as well as actual elements. But identity in this sense is not describable in mathematical formulae - the self is not a substance in the sense of being an object of scientific knowledge. Hence, as Kant showed, whilst ever knowledge is equated to scientific knowledge (mathematical physics) of physical objects, the category of substance so interpreted is of limited application - just as knowledge itself is confined to phenomena, these being, the first Critique shows, the only things which can be known as objects.

Thus, reflection upon the problems and limits of a quasi-mathematical conception of substance brings us, lastly, to consider its wider epistemological bearings, to summarise briefly the restricted and exclusive view of knowledge which results from over-pressing the analogy of mathematics. If knowledge, by definition, involves certainty, and is accordingly only possible by means of the "clear and distinct" perception of the understanding, it would seem logical to draw a rigid distinction between the memory and imagination as well as the senses, on the one hand, and
the understanding on the other, none of the former having any claim to afford a way to true knowledge. Such a view creates difficulties when the range of knowledge is extended to cover the objects of understanding ascribed to history, religion, art, etc., wherein other factors besides Reason (so defined) necessarily enter.

The disparagement of history, in the first place, as a form of knowledge, was inevitable. According to the mathematical pattern of rationality, it suffers on two counts. First, whereas mathematical thought is concerned with universals, the significant concepts of history are not universal but individual; the terms of the causal relation, for example, are not abstract characteristics but unique personalities. * Secondly, there is the problem of the mathematical knowledge of change (i.e. real, qualitative change). A substantialist metaphysic such as was produced by the scientific thought of the 17th century implies a theory of knowledge according to which the unchanging alone is knowable. The historical event, on the other hand, is the transitory event. The nemesis of similar substantiality in Graeco-Roman historiography, according to Collingwood,

* Although interpreted in a special sense in the light of his general thesis, this is basically the point made by Collingwood. The cause of an event (e.g. why Brutus stabs Caesar) he writes, for the historian means the thought in the mind of the person by whose agency the event comes about; and this is not something other than the event, it is the inside of the event itself. Collingwood. *Idea of History*
was also a historical scepticism. Be that as it may, a significant feature of Cartesian thought, resulting logically from its form of Rationalism was indeed its anti-historicism, a fact which contributed in no small degree to its later discredit and decline.

In the realms of art, poetry, literature, and religion, no less than in regard to historical knowledge, the "clear and distinct" criterion of rationality inevitably relegates these forms of human expression to the "irrational" in human experience. Nor was this consequence manifest in metaphysical systems alone. The effect in English literary developments in the 17th century, for instance, was "a set towards prose and good sense, and in reaction against the metaphysical tradition in poetry". (Willey.*) Attempts to translate the insights of Religion into quasi-mathematical or quasi-scientific terminology met with similar disaster. With the reduced meaning of the causal category, for instance, God becomes definitely relegated to the position of First Efficient Cause of motion within a universe which subsequently continues its way in the definite revolutions of a great mathematical machine. He is Himself conceived as a quasi-scientific hypothesis. Hence the famous remark of Pascal:

"I cannot forgive Descartes. In all his philosophy,

* Seventeenth Century Background.
he would have been quite willing to dispense with God. But he had to make Him give a fillip to set the world in motion: beyond this, he had no further need of God."

(Pensées.)

Whether or not this is a just estimate of the position of God in Descartes' metaphysics, it is undoubtedly the logical position of a God reached by a process of mathematical reasoning alone. It follows that a speculation concerning "final causes" is fruitless, because God's ways are beyond the understanding of man (mathematics being limited, as Descartes recognised, to the comprehension of the finite).

The over-all error which results in the restriction of the conception of "ways of knowing" described above, is that of neglecting the fact that in art and religion, for instance the symbolism is of another order than the clear and distinct propositions of mathematics; it is that of failing to seek, therefore, other hall-marks of reason, such as coherence, harmony, unity of structure, "objectivity" (Macmurray's term), within the creations of the human spirit wherever these are more appropriate. Yet of all these bearings and tendencies of conceiving knowledge with mathematics, perhaps the most far-reaching in effects lies in the resultant mechanical cause-effect relation described above, together with appropriate conceptions of rational explanation and criteria of intelligibility, and the consequent
development of the machine analogy as a whole. It is, accordingly, with some consequences of these characteristic features as reflected within political theory that the following chapter is concerned.

It was inevitable that philosophic pre-occupations with method and other aspects of mathematical science should be reflected in the treatment of social and political questions. A process of releasing political philosophy from its association with theology had begun with the Renaissance. It was furthered by the advances of science, which soon suggested that similar progress in solving the problems of social and political relationships might be made if these, too, were conceived as natural occurrences, open to study by observation, and more particularly, by logical analysis and deduction, in which supernatural elements had no important place.

Prima facie there were, undoubtedly, distinct advantages in the analogical extension of methods and categories from the field wherein such remarkable advances had been achieved to one from which medieval minds had not yet completely rubbed away. The traditional theory of Natural Law which had functioned so long as perhaps the most important co-ordinating idea within systematic political thinking...
CHAPTER VI

NATURAL LAW AND SEVENTEENTH CENTURY
POLITICAL THEORY.

It was inevitable that philosophic pre-occupations with method and other features of mathematical science should be reflected in the treatment of social and political questions. A process of releasing political philosophy from its association with theology had begun with the Renaissance. It was furthered by the advances of science, which soon suggested that similar progress in solving the problems of social and political relationships might be made if these, too, were conceived as natural occurrences, open to study by observation, and more particularly, by logical analysis and deduction, in which supernatural elements had no important place.

Prima facie there were, undoubtedly, distinct advantages in the analogical extension of methods and categories from the field wherein such remarkable advances had been achieved to one from which Medieval mists had not yet completely rolled away. The traditional theory of Natural Law which had functioned so long as perhaps the most important co-ordinating idea within systematic political thinking
stood, it seemed, only to gain by the "illumination" of mathematical analogies and new scientific ideals. The obvious advantages (to which we will briefly refer) were, however, also accompanied by the introduction of certain misleading ideas suggested by the scientific orientation of the categories and general terminology employed in the new formulations. In this way the fusion proved less happy than was anticipated, augmenting within the political sphere the general tendencies of Rationalism considered in the preceding chapter, and contributing ultimately to the breakdown of the original Natural Law analogy. It is often the case, however, that errors form the most instructive part of a doctrine or method. That they have, in this instance, served to elucidate further the nature of the Rationalist abstraction as a whole, and also to provoke more precise recognition of the assumptions at the basis of the political analogy itself, constitutes the chief reason for concentrating the first historical illustration upon this political theory.

The theory of Natural Law is itself, we have said, the product of analogical thinking. It expresses a "total assertion" about the foundation of political and moral obligation generally, on the basis of the particular obligations and their sources encountered in everyday civil life; one may term it a "legal analogy" in so far as "law" like "cause"
is a metaphor closely associated with the sphere of civil law. The most fruitful approach to the evaluation of this analogy within political philosophy lies in a closer examination of the particular functions it has been thought to serve, and an estimation of its success in doing so.

A precise definition of its function is difficult, since although the theory is one type of answer to certain recurring political problems, its precise interpretation has varied throughout its history, according to the different local emphases of the ages in which it has flourished. Perhaps all one can say in general is that it claims to give a rational explanation (i.e. rational as opposed to a voluntaristic, and of universal not merely particular reference) of the existence of "rules", in ethics, in law itself, and in political philosophy, by deriving them not from any arbitrary power, Divine or human, but from Reason. Thus, in ethics, it provides a rational basis for a system of "natural" ethics, affirming the existence of rational values as well as those disclosed by revelation. For law, it postulates a system of laws of universal validity, based not upon force but upon reason - on the intrinsic value of the law, not compulsive power. For political philosophy, such "rational" values form an essential foundation for the assessment of social and political institutions.

Whilst our present concern is mainly with the employment...
of the Natural Law analogy within the last of these, the doctrine itself closely relates all three. Indeed, a most significant feature is that it denies the autonomy of any one of them, endeavouring to act as a mediator between them. For it maintains that political philosophy is unable to take one step forward without, as Kant put it, doing homage to ethics. It insists equally strongly that ethical values must be given a "normative" expression if they are to have meaning within practical experience. Natural Law is itself an attempt to formulate in legal or normative terms certain fundamental values which are believed to have absolute validity. And finally, within legal philosophy, it rejects all empirical solutions to the question, "What is Law?". Knowledge of actual law can but describe what pertains to law at a given place and time, and affords no solution to the question, "What is Law?" To answer this it is necessary to explain not only what laws are, but why they exist - a question not of origin, but of justification. This question, being one of value, not fact, requires an answer in ethical terms.

In effect, Natural Law links the ideas of reason, fact and value: the discovery of a rational basis of existing laws and of men's obligation to obey them, makes possible also the estimation of their value, and affords a criterion of their validity.
Leaving aside temporarily the assumptions upon which the success of this function depends, it may be agreed that this analogy succeeds, as biological or psychological analogies do not, in suggesting an impersonal and universal ground of political obligation which theoretically should supersede the local claims of any state or imperial opportunism. It is, moreover, not confined to the provision of grounds for obedience, but may also sanction active disobedience to the existing laws of the polis on those same grounds of a "higher allegiance" — a feature which accounts for the mistrust to which the doctrine was often subjected even at the height of its theoretical acceptance. This indicates, of course, at the same time its chief general disadvantage; a characteristic it possesses in common with all abstract theories about human society is that of admitting such widely divergent and conflicting interpretations as to be of little practical value unsupported, and therefore to fail as an abstract "criterion" or "justification" of concrete laws or actions.

Nevertheless, the traditional analogy did serve an important function in co-ordinating the thoughts and views of those who refused to interpret their obligations exclusively

* One may recall the argument of the old man who attempted to assassinate the Professor in the novel of that title, by Rex Warner, — that it was the Professor's devotion to abstract justice which was his fatal weakness, and one which would further his (the fascist's) concrete ends. This is a revealing literary illustration of a deficiency of abstract theorising within the liberal tradition.
in terms of national boundaries or sovereign "will". Particularly important were the grounds given by Natural Law in Roman and Medieval times, for instance, to challenge any conception of positive laws as sacrosanct. The more specific difficulties which it involved - deriving, for instance, from the metaphors "nature" and "law" which were responsible for a degree of ambiguity which had always resided in the theory - were brought to light mainly as a result of the 17th century reformulation of the doctrine. For in the ultimate breakdown of the latter, (to be traced in succeeding paragraphs) is disclosed the precise nature of the presuppositions at the base of this whole analogy.

Whilst the existence of a universal law of nature, lying behind civil law and binding because of its intrinsic justice, was not questioned in the early 17th century, the grounds of its validity called for re-examination. There was a growing need for a secular version of Natural Law if the theory was to retain its significance for those who rejected theological arguments and sanctions after the Reformation. At the same time, Natural Law had to be more clearly differentiated from canon law, with which, as a result of Papal authority in preceding centuries, it had become increasingly identified. In short, "Two obstacles had to be overcome and two mighty enemies defeated if this fundamental thesis of Natural Law was to gain acceptance. On the one hand, law had
to assert its originality and its independence of theological dogma, and extricate itself from the perilous embrace of theology; on the other, the pure sphere of law had to be clearly determined and separated from the sphere of the state, and its unique nature and specific value had to be protected from state absolutism. The controversy over the foundation of the modern Law of Nature is fought out on this double point. It must be carried on as well against the theocratic viewpoint as against the Leviathan State — that is, against the derivation of law from a completely irrational Divine will which is impenetrable to human reason."

(Cassirer, The Philosophy of the Enlightenment.)

In both cases it is the axiom "stat pro ratione voluntas" which must be overthrown.

To this end, the analogy drawn between the sphere of politics and that of mathematical science is clearly a significant contribution. Emphasis is, of course, laid upon the mathematics of the latter, in abstraction from the outstanding empiricism characteristic of its foremost representatives (although political Rationalism generally was no more exclusively a priori than its epistemological parallel). The primary change thus introduced — and hence the chief significance of the 17th century theory of Natural Law — is methodological. Rational explanations in this century were scientific, describing efficient causes, or giving mathematical deductions. In the latter sense of "scientific", the new theory of Natural Law, as put forward by Grotius, for example, provided a rational or scientific method for arriving at a body of propositions underlying political arrangements and the provisions of positive law.
The discovery of the first principles of man's social life—concerning the nature of man and of the state—from which specific political principles were to be deduced, presented no difficulty to 17th century theorists. They had been discovered long ago,* and it remained only to re-state and re-formulate them in the language of "clear and distinct ideas". The actual definition of Natural Law given by Grotius, as a body of rules discoverable by human Reason is but a restatement of the Scholastic notion of a rational foundation of ethics. He also concedes that the Law of Nature is unquestionably of Divine origin. Nevertheless, he set out to construct a theory of law which could stand independently of theological presuppositions. The alternative method to hand was obviously that of mathematics. His oft-quoted mathematical analogies do not, however, in this case proceed from a mere desire to universalise a successful method. To treat law "withdrawn from every particular fact" signifies for him its independence, as regards

* They were a rejuvenation of Stoic ideas. It is worthy of remark that the appeal to Stoic philosophy in the 17th century has a special significance. It seemed to contain great promise in restoring man somewhat to the ethical "dignity" threatened by his metaphysical status in the new scientific world-picture, to compensate for his dethronement from the earlier central position held by men. Thus in a sense the stress on natural rights represents a "criticism" of the epistemological abstraction which "read men out of the universe" and with which, in consequence, man could not live; For, as Burtt has remarked, man could only enjoy life and endeavour when he believed he occupied a high place in the cosmic teleology.
truth and validity, from any factual embodiment in the
commands of sovereign or positive law. To quote Cassirer
again,

"If Natural Law connects law and mathematics in this
way, it is because it considers both as symbolising the
same fundamental energy. The doctrine of Natural Law
looks upon law and mathematics as the best evidence of
the autonomy and spontaneity of the intellect."
(Ibid.)

That the mathematical ideals of analysis, simplicity and
self-evident clarity were, moreover, perfect solvents for
authority and mere customary belief, added to the attractivenes
ess of the analogy. The appeal to reason for which Natural
Law ideas had always stood was, in the 17th century, chief-
ly directed against dogmatism and the blind following of
tradition. * As in the case of science, then, this involved
the rejection of Medieval methods and terminology in favour
of categories constructed to meet the problems at issue,
the "explanations" now being sought. This is not to

* Here, it has been suggested, lies the real significance
of the appeal to nature - "... it is an appeal against
authorities that had lost their sacredness, against insti-
tutions that had outlived their usefulness ... ."
Ritchie. * Natural Rights.
It is at the same time a defence of the individual
against particular legal pronouncements which may from time
to time proscribe his liberties in some "cause" treating
him as a "means" simply rather than as a member of the "King-
dom of Ends" (just as Cicero, for example, centuries earlier,
appealed to Natural Law in opposing the slavery permitted
under the positive laws of his time, insisting that under
Natural Law all men were of equal status and slavery non-
existent.)
suggest that "efficient causes" and scientific measurement figured prominently in the resultant political theories. The emphasis was, as remarked, one of method, patterned upon one aspect of science, its mathematical deductions. Through the medium of this analogy, however, the scientific influence of the century also affected the content of this theory, thus contributing, under the cover of unchanged terminology to a completely new orientation of the old theory, and eventually to its breakdown.

It is not being suggested that the scientific influence was solely responsible for the latter. Indeed it is recognised that we are abstracting from a complex situation in which science is but one amongst a series of conditions, contributing to the new formulation. Nor, in concentrating upon such features, do we imply that the influence of scientific method is that of a one-way causal relation between the methods and categories of natural sciences and the social, political and ethical thinking of the 17th century. In addition to the general intellectual and social climate, there were also more fundamental conditions within philosophy and the general cultural background which were responsible for the emphasis upon "method". In the preceding chapter, we mentioned for instance, the accent laid by Renaissance philosophers such as Montaigne upon the infinite diversity of nature and human nature which had presented
obstacles to systematic philosophising and of the urgent need for simplification which arose. The Cartesian concentration upon the "universal man", "abstract values" and the need for a precise criterion of truth, springs to a large extent from a reaction to such Renaissance Romanticism. The influence of contemporary science is, however, a very important condition, and is emphasised here for two main reasons. First, it is a significant instance of the way in which through the medium of terminology - the similar employment of analogical expressions such as "natural law", for instance, in science and political philosophy - certain ideas indigenous and appropriate to the one could pass into the other. Secondly, the breakdown of the political theory helps to elucidate the nature and limitations of the scientific abstractions themselves when extended to other fields, and thus provide that mode of criticism effectively performed by philosophy, by indicating and making explicit presuppositions unconsciously pervading thought and judgement.

Turning first to the more general features of the political parallel to epistemological Rationalism (i.e. whether of a predominantly "Baconian" or "Cartesian" form) the "search for certainty" once again is seen to provoke a consummate faith in "right methods" of finding "final solutions" to problems, and to conduce to the view that the only
knowledge strictly meriting the name is technical knowledge— that which is susceptible of complete, precise formulation in rules, directions, principles. Technique and certainty are so conjoined, because whereas the practical knowledge embodied in tradition, for instance, is vaguer, of a more indeterminate kind, technical knowledge appears to be self-complete, ranging between an identifiable initial point, sheer ignorance, and an identifiable terminal point, the mastering of the "rules".

Three consequent tendencies have been summarised by Oakeshott* as the main characteristics of "Rationalism in politics". First, the conduct of affairs is a matter of solving clearly defined problems, in which the consideration of tradition and circumstance are but obstacles to the operation of reason. "The assimilation of politics to engineering is the myth of rationalist politics." Secondly, it is a politics of perfection. The rational solution is the perfect solution; there is no place for a "best in the circumstances", only for "the best", the function of reason being precisely that of surmounting circumstances. So, thirdly, it is a politics of uniformity. A scheme which does not recognise circumstances can have no place for variety.

In short, Rationalism so characterised evinces in the sphere of politics that same tendency to underestimate the complexity and variety of situations (and likewise to mistrust the guidance of individual inspiration or insight) whether in nature or society, which was noted in the previous chapter. Thus, even in the late 16th century, Machiavelli, confident that the uniformity and homogeneity of nature disclosed by Galileo existed no less in man's political life, created a new "science of politics" by means of which he could construct his technical "handbook" for the guidance of the new Prince, untutored in practical diplomacy. In this respect Machiavelli was, as it were, "the Bacon of political philosophy".

The development of a more distinctively a prioristic Rationalism within the doctrine with which we are particularly concerned, on the other hand, is traceable through the changed connotation of Reason effected by the above described emphasis upon method and certainty. Although the older versions of Natural Law had always made appeal to Reason, the modern gave a greater degree of precision in its meaning. It now no longer meant a "gift of God" which is kindled by the "light of faith", as in the Medieval doctrine; nor yet the prudential insight nurtured upon experience, to which the Roman conception inclined. It was a self-dependent Reason, requiring direction and development by no
person or dogmatic authority, but by a rightly conceived method. For some Rationalists (Hobbes, for instance) it is rather a faculty of calculation by which one thing is concluded from another, suitable means discovered for attaining given ends which are not themselves subject to the criticism of reason. In short, it is rather a faculty by which a world pictured as a machine could be made intelligible.

In political theory, the demand for a "rational" method, as a consequence of these changes, issued as a demand for a clearly stateable criterion whereby the values of existing laws and institutions could be judged. The resultant attempt to define more precisely the content of Natural Law carried with it two potential dangers.

In the first place, 17th century Rationalism, as already indicated, implied a uniformity of political relations such that the precisely formulated dictates of Natural Law are eternally valid, and of universal application. The political and social struggles of the age are, however, inevitably reflected in the statement of the values thought to be deducible from these general principles; the individual rights stressed were those in particular need of vindication at that point. But to attribute the quality of universality to the specific needs of a particular time is dangerous; it leads directly to Utopianism, and to a neglect of the more
urgent problems arising at other times and places.

The second difficulty concerns the incompatibility of this urge for precision with the notion of absolute "value" for which Natural Law stood. Vico's distinction between two aspects of law is of significance here. There is, on the one hand, the "verum", the truth or moral value which law embodies. On the other lies the "certum" - the crude appearance which values assume when thus embodied. A system of authoritative precepts cannot do full justice to the value being indicated; this, then, is the price of the "certainty" and "precision" of such laws. Consequently, if Natural Law itself be expressed with legal precision, its "values" being formulated with the exactitude of civil rights, it is necessarily impoverished. The actual values legalised by civil rights are so describable because created by man; but the whole point of Natural Law was to indicate value not so created. To be over-concerned with the precision with which Natural Law is conceived is, therefore, ultimately to contribute to the breakdown, by bringing it onto the same level as the positive law which it is supposed to validate.

Attempts to express more precisely the content of such fundamental ideas, however, have the advantage of provoking (albeit in others than their adherents) closer scrutiny of the metaphor employed in that expression. Thus in the
17th century, the ambiguities of the "law" and "nature" metaphors did become more clearly revealed, and in consequence the presuppositions at the basis of the secular analogy were questioned.

The term "Nature" is used in at least four different senses,* failure to keep these distinctions clear leading to inevitable confusion in the questions supposedly clarified by this analogy. It may stand for "the totality of what exists"; or, more specifically, for what exists independently of human action; thirdly it may extend into the human sphere, to contrast what is "original" with that which is subsequently "acquired" as a result of voluntary effort; the fourth interpretation represents an "ideal" of what ought to be, whether or not it in fact so exists. The latter sense is clearly the proper meaning of the term when reference is made to a Natural Law or to Natural rights so guaranteed; yet unnecessary ambiguities have been introduced into these theories by failing to confine the metaphor to this chief connotation. Hence the confusion, for instance, between questions of logical status and historical existence of such a Law and primordial rights. As Ritchie observes,

"... people are always apt to make a picture of their ideal as some golden age in the past, to think of

---

* * Ritchie. Natural Rights. Chapter IV.
a reform as renewing some old right; and so the meaning of "natural" as ideal is mixed up with its meaning as "original". Two fallacies may thus arise. Either our historical notion of some period in the past is vitiated by idealisation of the facts, or the actual facts of the past are taken as of themselves determining what ought to be done now."

(Ibid. p. 75.)

Even its consistent usage to indicate "ideal" is not, however, free from ambiguities. Rather does the metaphor conceal certain assumptions which were not always made apparent, and which, theological sanctions apart, may with difficulty be "justified". The precise character of these assumptions - of which the principal relate to the rift between "real" and "ideal", and the status of "values" within the universe - were made apparent in the 17th century, notably by Spinoza and Hobbes, who, in radical opposition to all forms of metaphysical dualism, likewise questioned their justification. In so contrasting their more consistent mathematical monism in this sphere with the dualistic assumptions of the traditional Natural Law, they suggest the need to go beyond mathematics for the justifications of the latter.

Natural Law, for Spinoza, does not mean a specifically moral law, obedience to which distinguishes man from the rest of creation, but simply God's law for all his creatures, evidenced in man's "conatus" of self-assertion in no more singular manner than in the "appetitus" of lesser "modes".
Similarly, the political "rights" supposedly guaranteed by such a Law of Nature do not markedly differ from any other form of "rights" to be found in the natural world; for this term universally means simply "potentia", or a set of powers vested in some particular thing or persons. In this sense, it is true, men do have greater "rights" than are possessed by other forms of existence, since in virtue of his intelligence man is a finite mode in which more of God's power resides than those for which brute force is a primary characteristic. But a theory of rights so based—that is, upon a non-dualistic interpretation of Nature—affects no grounds for opposing the individual to the state; on the contrary the latter is the strongest of all God's creations, since it comprises all the "powers" of morality, religion, science—is the unification of the strongest of the individual "powers" which the world knows.

Hobbes shares this opposition to a "moral" connotation of the Nature metaphor. Accordingly, "the right of Nature" is for him but "the liberty each man hath, to use his own power, as he will himself for the preservation of his own nature..."* Likewise, "a Law of Nature, Lex Naturalis is a precept or general rule found out by reason, by which a man is forbidden to do that which is destructive of his life..."** Thus Hobbes is enabled to retain uniformity

* Leviathan.
** Ibid.
of method, to adhere to the mathematically-conceived process of reasoning by which such laws are discovered. Moreover, quite consistently he insists that they are in fact "theorems of prudence", not properly called laws except when commanded by God. * The subsequent deduction from the first fundamental rule, "to seek peace, and follow it," of the remaining eighteen "laws of Nature", and the content given to them, bears out the mathematical pattern; for the subsidiary laws are not only derived strictly from the initial clearly defined premise (in accordance with the method) but are also, significantly, one and all concerned with some aspect of "equal dealing". **

It may be noticed, in parenthesis, that despite the similarity of basic intention in Hobbes and Spinoza, a non-moral, non-dualistic rendering of Natural Law, the resultant political doctrines did however, differ in significant respects. The meaning attached to "freedom", for example

---

* "These dictates of reason, men used to call by the name of laws, but improperly; for they are but conclusions, or theorems concerning what conduceth to the conservation and defence of themselves; whereas law, properly, is the word of him that by right hath command over others. But yet, if we consider the same theorems, as delivered by the word of God . . . then they are properly called laws."

Leviathan. Chapter XV. p. 104.

** Compare also Hobbes' indication of "a rule by which the laws of nature may easily be examined", which is summed up in the words "Do not that to another, which thou wouldest not have done to thyself."

Leviathan. Chapter XV. p. 103.
was very different in each case. For Hobbes, the "obligation" created by law curtails a man's freedom to satisfy his desires. Reason, therefore, consists in the calculation of the best method of achieving the satisfaction of such physiologically conditioned needs. Whereas for Spinoza, Reason, far from being a calculative means to the most effective production of "natural" ends, is an end in itself; its exercise is the "good life" to which everything else is but the means. Thus Spinoza regards that form of government as "good" which makes possible the freedom to understand and "love" Nature, the universe, and not that which simply supplies freedom from organic wants and frustrations, thereby affording the degree of "security" from external ills which is the political Summum Bonum for Hobbes.

These differences apart, however, the point of significance here lies in the respect in which each of these philosophers in their different ways has elucidated the presuppositions embodied in this political analogy and the terminology in which it is couched, challenging those who cannot endorse their alternative "naturalistic" interpretation to provide more substantial justification for the abstraction upon which their own was based.

A second ambiguity in the Natural Law terminology also thus thrown into relief, pertains to the use of "law" itself, and is one by means of which the influence of science upon
the content of the theory may be expected to be particularly potent. Distinguishing between *Lex* and *Ius*, Hobbes points out that *Lex* properly means "command". The difficulty of getting away from this essential note in any analogical extension of the term is evidenced equally strongly in science. The generalisations concerning actual occurrences within nature to which scientific laws refer, often fail to remain so "depersonalised", being frequently "imaged" as commands imposed upon nature by some superior being. * This doctrine of "imposition" - whatever its ultimate validity (here left an open question) - was clearly an important presupposition of the science being developed in the 17th century, constituting "... the simplified notion of Nature with which Galileo, Descartes, and Newton finally launched modern science on its triumphant career". (Whitehead) From the Deism which is part of the whole conception, it follows that

"... the Laws of Nature will be exactly obeyed. Certainly, what God meant He did. When He said, Let there be light, there was light and not a mere imitation of a statistical average ... But even before Descartes, it was the implicit belief in some form of imposition, with its consequent exactness, that constituted the active

---

* "Hence people see no inherent absurdity in talking about 'interferences with the laws of nature' - whether they picture the sovereign of the universe, on grave emergencies, issuing special 'orders', dispensing some portion of his subjects from their habitual obedience, or whether they imagine human beings acting in such a way as to violate the commands which Nature has imposed on them ...."  
force in scientific research."*
(Adventures of Ideas. p. 136.)

The conception of scientific "laws which cannot be broken" flourishing in this century, then, inevitably supported a similar interpretation of law in politics, which was further accentuated by the mathematical analogy introduced into the new secular theory. Assimilating methods of political thinking to those of geometrical enquiry, all rational thought to deductive reasoning which starts from "eternal truths" of some kind, the Law of Nature inevitably acquires a peculiar, quasi-theological status. It is at once factual and axiological, and a confused mixture of law meaning "command" and law meaning logical or deductive "necessitation". ** The way in which the nature of this confusion received more precise indication within the secularised theory itself, and the part which in consequence it played in the breakdown of the modern version of the political analogy, will be referred to in more detail at a later point in this discussion. Before doing so, however, we

* That the doctrine of "imposition" both suggests, and is itself the outcome of, a type of Deism is exemplified, Whitehead earlier remarked, in the writing of Newton. "... We know from Newton's own statements that this was exactly how the Deistic problem presented itself to him. He definitely stated that the correlated modes of behaviour of the bodies forming the solar system required God for the imposition of the principles on which all depended."
Ibid. p. 135.

** Hobbes alone emphasised the distinction. See page 159.
must first enquire more specifically into the detailed effects of applying the mathematical ideals of analysis, simplicity and self-evidence within political philosophy.

The belief that social and political relations are completely understandable by methods of analysis fits together with and supports a conception of society as simply an aggregate of individuals. Herein lies the clearest difference between the modern and the Medieval theory of Natural Law; the self-evident starting point of political deductions in the 17th century lays emphasis upon the individual man rather than society as a whole. Membership of a community, allegiance to its laws, requires explanation; it is no longer one of the "ultimate facts" about human nature. The individual is both logically and ethically prior to society. *

The results of this change of attitude are far-reaching.

In the first place, from this derives the "individualism" of the modern version of Natural Law. In Medieval political thought the source of power of any authority believed to derive ultimately from God, was less a source of rights than of duties, of obedience due to ultimate moral (and Divine) principles. The general tendency of political

* "To the philosophy of the 17th century, relations always appeared thinner than substances; man was the substance, society the relation."

Sabine.
reflection in the 17th century, on the other hand, was to lay stress upon the individual and his rights. This characteristic has been responsible for the most frequent objection levelled against the Modern Law of Nature - its individualism; that it is rather a theory of rights than a law of any kind. "Individualism" is a much misused term; it is essential, therefore, to distinguish between its "virtuous" and "vicious" forms, in order to see more clearly how this feature may have contributed to the disrepute into which Natural Law theories fell.

Any Rationalism, or stress upon the power of individual Reason, conduces to individualism as opposed to authoritarianism. Appeal to the individual judgement does not, however, necessarily imply the cruder individualism and arbitrariness of judgement to which objection is usually made. The emphasis, as in Stoicism, is upon the universality of Reason. Nor does such an appeal necessarily entail anarchy, urging only the supersession of uncritically accepted and irrational authority. The difference between rational and irrational authority is too often overlooked; the former is not in conflict with the individual, but in fact frequently aids the growth and expansion of his very individuality. At the same time, it is important to stress the unique value of the individual person, making him, rather than an absolute State or theological authority, responsible
for the values he adopts and the rights he endorses. A Romantic philosophy, for instance, may, as Barker puts it,

"... ennoble the individual and lift him above the self-centred concern in his own immediate life. But it may also be a philosophy which engulfs his life and absorbs individuality; and it may end, in practice, in little more than the brute and instinctive automatism of the hive . . ."

(Introduction to Gierke's Natural Law and Theory of Society. p. xvii.)

Nor, yet, does the emphasis upon "rights" inevitably destroy the primacy, or the binding force of moral law. It is not, in other words, necessarily a selfish theory which ignores the correlative moral duties towards one's fellow men. Individualism only becomes vicious in this sense on a Spencerian type of interpretation.

Nevertheless, there is one important element of truth in these lines of criticism. To consider the isolated individual as the ultimate political unit, and his atom-like "rights" as the values for the preservation of which Natural Law primarily exists, may tend to make political values self-regarding. This is borne out by the conflict between "rights" and "justice", which made its appearance on this point. Problems arose for 17th century political philosophers in connection with the claims of justice - and particularly of punishment - precisely because they did not make it sufficiently clear that no political right is merely a privilege, but carries with it also an obligation - both to the state collectively, and to individual persons.
The "individualism" of the Natural Law theory has frequently been associated by its critics (particularly the German Romantics) with the development of scientific methods and ideals. And undoubtedly the latter have significantly influenced the content given to the natural rights attributed to the individual, particularly those of equality and liberty. The relation of the former of these rights to the ideal of quantitative analysis may be selected to illustrate the far-reaching consequences of this aspect of the mathematical analogy upon political thinking.

The scientific advances of this century had rested on the assumption that reality, in the last analysis, consists of homogeneous units, to which all qualitative differences are reducible. Based on analogy with the homogeneity of the parts of a quantitative whole the social application of the methods of mathematical science suggests a similar conception of the equality of man. Scientific conceptions are reflected in the abandonment of a belief in a hierarchical ordering of the universe. Just as "the Great Chain of Being" now ceases to be an unquestioned metaphysical dogma, so in a predominantly quantitative world, traditional social differences of status begin to seem precarious. It is simply as a human being - not as a priest, soldier, or member of a guild - that a man possesses certain natural rights prior to society.
If the scientific ideal be rigorously pursued, however, the identity of these rights comes to depend not upon a "Protestant" insistence upon the equality of status of all men, the absolute worth of every individual before God, but upon the "homogeneity" of mankind. Hobbes, for instance, does take this logical step, asserting the likeness of all men in respect of "faculties" and power.

"Nature hath made men so equal in the faculties of body and mind, as that, though there be found one man sometimes manifestly stronger in body, or of quicker mind than another, yet when all is reckoned together the difference between man and man is not so considerable, as that one man can thereupon claim to himself any benefit to which another may not pretend as well as he." (Leviathan. Chapter XIII.)

In consequence, "democratic" theory and practice influenced by these specifically scientific developments may finally lead in a completely opposite direction; "mass democracy" created by ideals of equality so interpreted conduces ultimately to authoritarianism (as Hobbes again shows).

The manner in which scientific ideas help to bring this about is not difficult to see. In the 17th century the methods and categories of the new science had greatly simplified older theories about the nature of the universe; *

* In his Democracy in America De Tocqueville vividly points out how ultimately democratic extremes equalize by degrading; that is, individualities are levelled out and personalities become of little account.
the basis of classification was no longer in terms of mys-
terious occult qualities, but was ascribed to the particu-
lar arrangement of minute homogeneous particles, such as
were describable by means of a simple system of mathematical
laws. It is simply necessary to assume that men, too, are
just like individual physical atoms in a Newtonian system;
it will be taken for granted that their behaviour, like
that of physical atoms, is determined by universal laws.
And since men are thus fundamentally equal and identical,
al the inequalities and differences which exist between
them are instances of injustice.

It might be argued - and is often implied by supporters
of the most extreme and radical democracy - that the question
at issue is moral, not metaphysical; that the movement has done
a great deal towards preventing the exploitation of the weak
by the strong, and that its metaphysical affinities with,
and presupposition of, a particular scientific attitude are
irrelevant. The notions it employs, however, clearly bear
the impress of such modes of thought. Consequently, with
this doctrine of "equality" goes an acceptance of uniformity
in taste, beliefs and behaviour. A result of this kind of
emphasis which not infrequently appears is that institutions
which start by defending the weak from exploitation by the
strong may in fact end up by curtailing the freedom of indi-
viduals to control their own lives. Thus it is, as
Weldon points out * noticeable that "the state in which
equality is regarded as all-important and the full-blooded
organic State are liable to have a good deal of superficial
likeness to one another". The reason is, as he indicates,
that to concentrate upon the characteristics which human
beings are alleged to possess in common results in ignoring
as accidental and irrelevant the particular characteristics
of the individual John Smith. He becomes an atom behaving
in accordance with fixed and unalterable psychological laws.
And even if the idea of moral laws be introduced, the indi-
vidual in his qualitative uniqueness remains non-effective.
The ground for acting morally towards him is but a "motive-
less respect not for Smith quâ Smith, but for the 'humanity'
of which Smith is a particular instance". (Ibid.) Radical
democracy, as Weldon calls this view, values the indi-
vidual very highly, but for the wrong reason. "John Smith
matters, not because he is this particular individual with
definite hopes, fears and attachments, but because he is a
specimen of the idea of humanity... He does not act, he
behaves." (Ibid.)

Thus, the doctrine of natural rights in the crude form
which involves the assumption of the equality and similarity
of all mankind may, far from being democratic and the pre-
server of individual liberty, lead to totalitarianism.

* States and Morals.
Reflecting the attitude of the physical scientist to the object of his study, it regards men as atomistic individuals, not as personalities. The doctrine of human equality as interpreted, for example, by Bentham, regards men for all practical purposes as identical: they are like the replaceable parts of a machine. Such conceptions may not be intrinsic to Natural Law in the intention of its 17th century theorists; but that the individualism characteristic of its content does contain these potentialities, and frequently received this pseudo-scientific interpretation is clearly suggested by the typical Romantic reaction against this whole way of thinking, to which we referred. Gierke, for instance, emphasises that

"Romanticism is a revolution, a thorough and genuine revolution: ... a revolution, above all, against the whole of the mathematico-mechanical spirit of science in western Europe, against a conception of Natural Law which sought to blend utility with morality, against the bare abstraction of a universal and equal Humanity."

(Natural Law and the Theory of Society, p. 210.)

The application of quasi-mathematical analysis to the understanding of society creates a further significant problem; that of accounting for political obligation - which became noticeably more acute in the 17th century. Some attempt had to be made to reconcile the primacy of the individual and his rights with this obligation. To this end, a further legal analogy - that of contract - was invoked to supplement Natural Law at this point.
The Social Contract was the only way left for deducing the existence of social and political institutions once man's individual Reason was made the ultimate standard of values. The construction is unmistakably Rationalist; taking the individual as the self-evident starting point of political thinking, it is the only possible means of setting his natural rights within the framework of the State, and of giving a rational explanation of the action of obligation characterising the relation between the individual and the State. Moreover contract is, inter alia, the legal instrument of manipulation for the purpose of collecting a number of individuals in a single aggregate. The appeal of such an analogy to an Age inured to mathematical ways of thought is obvious. A group of people thus collected is not united in any genuine unity as Romanticism understood it, but simply in the way in which arithmetical figures constitute a sum, or algebraic symbols are put within a bracket. Hence Maitland's reference to this theory of groups in the language of mathematical metaphor as "the Bracket Theory".

The appeal of this theory was, in addition, due not only to its mathematical form, but also to the fact that it was in keeping with — and furthered — the whole modern philosophic revolt against Medieval "mystery-mongering". As Cassirer rightly remarks, * that this doctrine of State

* The Myth of the State.
became in the 17th century a self-evident axiom of political thought was a very important and significant step in the history of the myth of the State. For to reduce the legal and social order to free individual acts removes the "mystery" from that association which is the State, tracing it to an origin which renders it a clear and understandable fact.

The theory does little, however, to correct the inadequacies of Natural Law. The idea of legal contract does not, in the first place, touch the problem of why men ought to obey the existing laws of the state in which they happen to have been born, and of why this obligation may in fact sometimes override the moral obligation to obey the dictates of the individual conscience. The Law of Nature professed to be normative, but a contract can only tell us why we are in fact bound - not that we ought to be. Furthermore, the idea of contract simply rests political obligation upon one particular form of moral obligation - that of keeping promises. In the 17th century it seemed axiomatic that an obligation, to be really binding, must be freely assumed and cannot be imposed by force; this is also why to attribute political obligation to a promise initiated and sustained by the interests and motives of men themselves, therefore, seemed the only rational way. This however, as Hume later pointed out, does not solve the problem, but merely pushes
it back a stage. *

In short, the Contract Theory itself presupposes the sanction of Natural Law to reinforce the obligation to keep promises. Apart from the logical circularity here involved, to rest political obligation upon a promise raises two further problems. How much of the detail of a constitution to which allegiance is owed does the "promise" comprehend? And might not such a promise equally well be used to justify obedience to a law which is the promulgation of mere "will"? In the latter case, it fails to reinforce the aim of Natural Law: obligation is not, by the contract, specifically related to the intrinsic, rational value of the law as distinct from force.

To conclude this brief consideration of the more direct bearing of mathematical analogies upon the theory of Natural Law, we may note the immediate effects of the operation of the ideals of "simplicity" and "self-evidence". The rights of man are "simple and self-evident principles". The evidence of reason is sufficient in questions relating to individual rights and the basis of political obligation; their justification no longer depends upon faith or authority, for Reason is its own authority. The propositions, like the

* "The obligation to allegiance being of like force and authority with the obligation to fidelity, we gain nothing by resolving the one into the other . . ."  
  Treatise on Human Nature.
mathematical proposition $2 \times 2 = 4$, are axiomatic - they are guaranteed by their clearness and simplicity and self-evidence. And, like the principles of mathematical science, those of Natural Law form a coherent system, being deducible one from another. Similarly, civil rights are justified by deducing them from the primordial natural rights.

The major difficulty in the idea of "self-evident principles" is that agreement upon their self-evidence is only obtained when they are couched in terms so absolutely general as to be tautologous. When more precise content is given to them, or to the nature of the "natural rights" supposedly deduced from them, there is no general agreement. The self-evidence of mathematical principles proceeds from their purely abstract and general character. The 17th century Natural Law Theorists, however, wanted to give content to the values they deduced from Natural Law precepts: mathematical analogies were, therefore no longer applicable. For self-evident mathematical propositions are purely formal. Consequently, it is only possible to draw an analogy between "values" and mathematical propositions if the former, too, are purely formal.

Although it may be said that the analogy of the 17th century theory is mechanical rather than mathematical, principles of politics being by the Natural Law theorists assimilated to principles of mechanics, the influence of mathematical ideas is clearly shown by the example which Grotius, for instance, gave.
Further, the principles of politics cannot strictly be claimed to be like principles of mechanics (see footnote on page 174). They differ significantly, that is to say, not only from the abstract analytic notions of mathematics, but also from the mechanical principles which claim to be synthetic a priori. For certain conditions must be fulfilled before a priori status can be claimed in respect of a particular subject - notably that of the homogeneity of its subject-matter. Political principles can only be treated as a priori if, for instance, there is in fact a uniform pattern of man which remains unchanged by place or time; if it can be assumed that men are universally governed by the same motives. This assumption is made by Hobbes, of course, who accordingly regards all men as motivated by self-interest - thus retaining even more closely the analogy between political and mechanical principles, in that human motivation for Hobbes approximates to forces; men always react in the same way, self-interest operating in a manner closely similar to any "pressure of gases". Such an assumption could not, however, be rigorously pursued by adherents to a normative conception of Natural Law; yet it is clearly required if political principles are to be constructed on analogy with those of mechanics, and to retain their a priori character.

It is also assumed in respect of the self-evident principles that the "rights" thus perceived are unchanging,
hence the formula "simple and inalienable rights of man". Social and political circumstances, as well as history, are irrelevant to their validity, as to the validity of the dictates of the Law of Nature generally. (Vico alone pleaded that the "ideal eternal law" could be fully revealed only in the long ordeal and suffering of man.) The "simplicity" of natural rights, in other words, presupposes that they may be exactly stated independently of the context in which their claim may be legitimate and urgent. This abstraction may, however, at least be contested by those who believe ethical statements to characterise a total complex of relations; by those who dispute analyses which (like that of Moore, for example) refer to "values" as "qualities" of things, analogous to objects of sense-perception, and having a similar independence of each other and of their context. For such analyses concentrate upon factors common to all situations, neglecting the context to which ethical judgements necessarily refer. On similar grounds, * it would seem that no purely abstract or universal definition of value could be adequate, since value is always exhibited

* It seems reasonable to hold that it is impossible to draw up any list of natural rights (beyond more or less "formal" ones such as the right to equal consideration in respect of individuals or their goods) which hold in all circumstances. The inevitable "clash" between conflicting "rights" in different times and circumstances would necessitate a most complicated addition of reservations, and reduce their ability to furnish any practical criterion.
in concrete forms. But in the parallel case of "inalienable rights", this is just what the 17th century Natural Law theorists were trying to do. At least, they were confusing the two, and attempting to give in concrete terms, universal abstract values or rights. In doing so, they again departed from the strict parallel with mathematics which asserts "self-evidence" and "simplicity" only of propositions which are completely abstract and devoid of factual content.

The uncritical and somewhat inconsistent use of mathematical analogies considered in the foregoing, led to a more general confusion in the 17th century between moral, logical and factual relations — and one which at first concealed the unjustified assumptions upon which, we suggested earlier, the modern theory of Natural Law was based. That is to say, in substituting for theological sanctions the self-evidence of mathematical propositions, it was assumed that logical, factual and moral necessity entailed one another. The chief practical utility of Natural Law lay in the introduction of a normative element into politics and law. But with the disappearance of the theological frame of reference, this function could seem possible only because of two inherent ambiguities in the notion of Natural Law. These (already, it was seen, potentially existing in the metaphors "Nature" and "Law") can now be more precisely indicated.
The first, to which Hume drew attention, was between factual truth and logical implication. Some relationships are "necessary" in that neither "will" nor authority can change them. These necessary relationships which the Law of Nature expresses (that obligations must be fulfilled, etc.) whilst leaving a considerable range within which positive law may vary, definitely rule out certain combinations. But to draw a conclusion from the Laws of Nature does not mean that it necessarily fits the facts in a particular situation, since the drawing of a logical implication does not of itself guarantee factual truth.

Secondly, there is confusion between moral and logical necessity. It is presupposed that the self-evident propositions of Natural Law are normative. But the self-evidence of a proposition does not guarantee it to be a standard of what ought to be. The necessity of a geometrical axiom, and the necessity that law should be just, are clearly different kinds of necessity. The latter refers to the realising of human ends and purposes; the former is purely formal.

With the removal of theological sanctions, then, the Natural Law theory inevitably breaks down in one of two ways. It becomes either transcendent, and, where its claim to "self-evidence" is not accepted, devoid of empirical justification; or immanent, and failing some belief in an
Absolute Will of which actual legislation is an expression, devoid of normative force. Historically, the recognition of this impasse is expressed in two lines of attack upon the theory of Natural Law; these also illustrate the critical function of the history of philosophy in regard to over- pressed analogies, and the abstractions upon which they are based.

First, that of empiricism; this philosophy has no place for "transcendent values", since they cannot be perceived or inferred from experience. Nor does it require them - the harmony of nature and order of society can equally well be explained in terms of utility. In the place of individual rights, or natural justice, which lack all empirical evidence, there remains utility, in terms either of self-interest, or of social stability, issuing in certain conventional standards of conduct which on the whole serve human purposes. Such conventions may be called universal in the sense that they are relatively permanent and widespread, human motives being fairly uniform. But the attempts of abstract rationalism to find in them an eternal fitting- ness or rightness are merely confused ways of saying they are useful, and happen to be so for the majority of people.

The other alternative was taken by Hegel and the school of Positive law. Idealist philosophy attacked Hume's chief premise, denying the rigid distinction between reason,
fact and value. For by interpreting Reason as including them all at once, a new logic, metaphysic, and defence of absolute values might be produced. In this new synthesis, it was also hoped to fuse the respect for sentiment, as against "abstract reason", the respect for value and custom (interpreted as the gradual unfolding of reason implicit in the consciousness of a race or nation) and a new sense of the meaning of history. Reason in man is a manifestation of an underlying cosmic spirit which realises itself gradually in the history of nations.

The "immanent" conception of law which results from this metaphysic effects a grand synthesis in which the problems relating to the conflict of "ideal" and "actual" disappear. The "real" is the "ideal". Natural Law, essentially a "dualist" doctrine, is but a stage, beyond which true philosophy must advance. The "abstract rationalism" which became the distinguishing mark of the theory in the last stage of its development is accordingly combated by the Romantic vindication of growth and development. The Historical School, in the course of this reaction, seeks the origin and explanation of legal and political phenomena not in the individual, but in the collective life of the nation. Once again, although from a vastly different point of view, the normative conceptions of natural justice, and civil rights, are over-ridden. What is, ought to be,
because no other meaning can be given to "ought".

Thus the breakdown of the secular version of Natural Law - logically and historically - has illustrated the limitations imposed by the influence of one type of abstraction upon the selection and use of analogies within philosophy. The precision lent to the conception of Reason underlying the 17th century Law of Nature was in terms of mathematical science. And yet, at the same time, its practical aspect was presupposed. If, however, as Hume insisted, Reason is not strictly applicable within the sphere of human action and valuation, then that presupposition in Natural Law theories is based upon a confusion of three fundamentally different operations - deduction, discovery of empirical or causal relations, and the ascription of value. If the first alone is Reason in the strict sense, the alleged "rationality" of Natural Law collapses. Reason can only be concerned with calculating means to ends, and not with evaluating the ends themselves. These latter are the concern of desire, emotion, passion, to which "Reason is, and ought to be, the slave . . . ."

The problem of justifying the employment of the word Reason in the second and third of the operations thus distinguished did not arise for the Medieval Natural Law. For human Reason - the "Divine spark" in man - like the Law of Nature itself, derived from the Being of God, and was,
therefore, essentially concerned with the perception of man's true "ends". The 17th century theorists, on the other hand, in their eagerness to establish a Law of Nature independent of theological presupposition, were, by the very methods and analogies they chose, opening up the way to the identification of Reason with the processes of mathematical calculation, and the drawing of deductive inferences. That such was far from their intention is obvious. But they omitted to examine the sense in which Reason, as considered apart from the Being of God, and as pre-eminently illustrated in the perception of mathematical self-evident truths, could be thought to consist in more than this. Consequently, although the clear indication of these difficulties was left for Hume, the 17th century analogy itself contains the seeds of its breakdown in its very omission of the Medieval "tertium quid" without investigating how the gap thus created could be filled.

Other factors have, of course, also been responsible for the general disrepute into which Natural Law thinking fell. It has been thought, for instance, to entail the undue moralisation of law; to conduce to legalistic ethics; and to make the idea of justice either too concretely legalistic (confined to "distributive justice") or too abstract. In regard to the first point, Natural Law theorists have, I think, been more aware of the "differential characters" of
law and morals than some criticisms may suggest. They recognised, for instance, that the purpose of law cannot go beyond external conformity, but were concerned to vindicate such an "ethical minimum" of its function. As to the second and third, however, it is probably true that Natural Law theorists have tended to suggest that moral values can be exhaustively expressed in terms of law, and have perhaps not made clear enough the essential element in "justice" which the theory must defend. This is the value of moral personality in individual men. And it is in this sense that the State, qua bearer of justice exists for the sake of the individual, rather than conversely; not because the individual is logically or historically prior to society. The phrase "Law of Humanity" perhaps expresses better than "Law of Justice" this essential concern. Ideas of political justice are but mediators of the more fundamental obligations to humanity.

In view of this essential function, it is necessary to purge the idea of Natural Law of the alien elements deriving from scientific abstractions - those elements which perhaps give some degree of justification to the critics who see such ideas as but "cold rationalism and equalitarian atomism, a world of superficiality and Pharisaism". (Troeltsch, on Natural Law and Humanity. Appendix 1; Gierke. "Natural Law.") For the idea of a Law of Nature is still a valuable
"regulative" idea, serving to remind men of the importance of ethics to law and politics, and of the inevitable imperfection of all positive laws and institutions. That is why, although himself always a critic of Natural Law, Gierke writes,

"I regard as mistaken all the attempts to resuscitate Natural Law into a bodily existence, which can only be the existence of a simulacrum. But the undying spirit of that Law can never be extinguished. If it is denied entry into the body of positive law, it flutters about the room like a ghost, and threatens to turn into a vampire which sucks the blood from the body of Law. We have to accept together both the external experience which testifies that all valid Law is positive, and the internal experience which affirms that the living force of Law is derived from an idea of Right which is innate in humanity . . ."

(The Development of Political Theory.)

Valuable as this political analogy is as such a "co-ordinating" idea, the presuppositions upon which it is based must be recognised and clarified. It is for this reason that, despite the misleading scientific ideas so introduced, we maintain that the incorporation of mathematical analogies into the sphere of political philosophy was of "critical" importance. The breakdown of the new secularised theory was of value both in making explicit the nature of these assumptions, and also in exhibiting more precisely the general character and limitations of the Rationalist abstraction itself.
SECTION III

SOME INADVERTENT CRITICISMS OF RATIONALISM IN SEVENTEENTH CENTURY PHILOSOPHY

CHAPTER VII.

MATHEMATICAL METHOD AND METAPHYSICS — THE CARTESIAN "EXPERIMENT".

Inadvertent "self-criticism", it was suggested, is an important feature of philosophy. It may occur within the systematic thinking of a single philosopher who, by rigorous pursuit of the logical implications of the "unity pattern" governing his reflections, thus reveals the limitations of his basic analogy, and of the sphere from which it was drawn. Alternatively, it may be performed by the history of philosophy (on even the smallest time-scale) in so far as novel lines of thought often take rise from recognised errors and deficiencies of some aspects of preceding philosophical systems, thus supplementing and correcting the abstractions upon which they were based.
The distinctive feature of Descartes' "mathematical method" lies in its emphasis upon two features of Euclidean geometry - the "intuition" of the first principles (Descartes and Euclid sharing an "intuitionist" theory of mathematics: in contrast to, for example, that of Hobbes); and the linear pattern of inference in subsequent deductions. These features of Descartes' specific interpretation of the Euclidean model are seen in greater detail in the paragraphs following.
In this Section, our discussion becomes less general than in earlier chapters, considering this occurrence (in one or other of the above-mentioned ways) within Rationalism, by suggesting some points at which effective criticism of the Rationalist abstraction is to be found in three of its outstanding representatives in 17th century philosophy: Descartes, Spinoza and Hobbes. It is significant that the analogy of mathematics, systematically employed within the philosophies here selected should have led to such diverse results. Descartes' interpretation and employment of mathematical method (the aspect of the analogy upon which we are concentrating) was not that of Spinoza, nor yet of Hobbes.* The theories of the latter purport to avoid many of the errors and difficulties disclosed in the Cartesian abstraction. Yet even before attention was so directly drawn to these difficulties, they had been indicated within Descartes' own philosophy by the nature of the further assumptions with which he had of necessity to supplement his method within the metaphysics supposedly constructed upon the mathematical pattern alone.

In order to illustrate this instance of "self-evidenced criticism", we must, however, first examine in some detail Descartes' attempt to develop a systematic examination of philosophical problems along strictly mathematical lines, comparing its basic structure (as seen in the Meditations)
with the significant points of method outlined in the Regulae and Discourse. Only when this has been carried out in some detail can the nature of the extraneous non-mathematical factors inevitably introduced be clearly perceived, and significantly related to the order of philosophical "criticism" with the illustration of which this section is primarily concerned.

The certainty of mathematics for Descartes had a two-fold explanation:

"They (arithmetic and geometry) alone treat of an object so pure and simple as to admit of nothing that experience can render uncertain: they entirely consist in a sequence of consequences which are rationally deduced." (Rule II. p. 9. Regulae. *)

Any "search for the direct road to truth", then, must embody these two features of mathematical method. The starting point of reasoning must be found in the simple and self-evident propositions concerning which no doubt is possible. Likewise, within the subsequent trains of deductive reasoning which draw out the implications of the initial intuition - the "pure illation of one thing from another" - every step must be simple and infallibly perceived. Thus, the "chief secret of the method" was that reasoning should be orderly, embodying these two features of self-evident intellectual intuition and necessary deduction, the only

* Page numberings refer throughout to the Kemp Smith translations.
road leading to certain knowledge which was open to man.

It is necessary to examine more precisely the nature of these operations of the understanding since they are so integral to Descartes' conception of method.

"By intuition I understand, not the fluctuating testimony of the senses, nor the misleading judgement of a wrongly combining imagination, but the apprehension which the mind, pure and attentive, gives us so easily and so distinctly that we are thereby freed from all doubt as to what it is that we are apprehending."
(Rule III. Regulae, p. 12)

This operation he later (Rule IX, p. 45) describes on analogy with vision, likening the development of "perspicuity" of intellect to the process whereby workmen can, by limiting their attention to specific directions, with practice become capable of fine distinctions, distinctions overlooked by those whose attention wanders unchecked amongst a multitude of objects.

It is clear that intellectual intuition is regarded as the primary intellectual operation, all knowledge being ultimately of this form. Deduction does not disclose a different kind of knowledge,* but rather serves to extend the power of intuition: it is the instrument by which the more complex may be gathered before the mind, so facilitating intuition of the whole. The cultivation of human "sagacity" (Rule X.) is an essential part of enlarging human

* Descartes points out the precise relation clearly in Rule XI.
perspicacity. For whereas the mind can know with certainty and immediacy the simple constituents resulting from analysis of the complex, true scientific knowledge is not achieved until intuition has extended from the simple to the complex, for which the aid of this supplementary mode of reasoning is demanded. (Rule III.) "Thereby," as Kemp Smith succinctly puts it, "intuition shows itself to be not an isolated act, but a growing capacity of the mind for truth, each new truth serving as an instrument in the discovery of others." The certitude of deduction differs from that of intuition in that it involves "a certain movement or succession" and so "rests in some way on memory;" but this simply presents methodological problems, calling for the further supplementary process of "enumeration," in which the steps of the deduction are constantly reviewed. * It is, that is to say, a difficulty of practice, not of principle. So long as the data are rightly ordered, and methodically reviewed, it is, according to Descartes, impossible to make a wrong inference. Thus deduction plays an important part in the attainment of complete knowledge, since, Descartes suggests, the class of ultimate self-evident truths is in fact limited, and human knowledge necessarily involves

* "And not only is the memory thus strengthened, the sluggishness of our mental powers is diminished and their capacity extended." (Rule VII, p. 81.)
"remote conclusions".

The important characteristic of deduction itself is that the inference, as in mathematics, is linear, moving along a "chain" of "necessarily connected" truths, until the whole sequence of truths lies clear before the mind, enabling the last to be grasped as a necessary consequence of the first. Emphasis is to be placed upon the persistent element of intuition in his account, since this forms the chief mark of Descartes' method of deduction distinguishing it from that involved in syllogistic reasoning.* In the form in which syllogistic arguments are symbolised - if $A = B$, and $B = C$, then $A = C$ - the dependence of the determinate value of $C$ upon that of $A$ is never seen directly as a concrete piece of knowledge. That is, the truth of a new item of knowledge is reached not as a result of the direct insight of the individual reason, perceiving that truth ultimately in its own self-evidence, but depends rather upon the mere "formal" ordering of the symbols.

Descartes' substitution of his own specific conception of deductive reasoning for the syllogistic logic of the Schools is in this respect associated with his general rejection of authority and insistence upon the personal verification of

* Cf. N. Kemp Smith's New Studies in the Philosophy of Descartes; hereafter referred to as "New Studies."
truth.

The manner in which the two fundamental operations of the mind, intellectual intuition and deduction, are integrated within Descartes' proposed "method", is most clearly indicated in Rule V of the Regulæ and, correspondingly, in Rules 2 and 3 of the Discourse. In this one requirement — that of resolving involved and obscure data to those which are simpler, ascending from the simplest intuitions to more complex knowledge — we have, Descartes tells us, "the sum of all human endeavour", the Ariadne's thread which will guide men through the labyrinth of knowledge. The rule immediately following (i.e. in the Regulæ) enlarges upon this, showing more precisely how things can be arranged in a series, headed by the simplest, in which more remote truths are directly deduced from other truths. Nor must the smallest link be missing, else the chain is broken and the certainty of the conclusion lost. (Rule VII.)

Although Descartes does not use the analytic-synthetic terminology in the Regulæ, even here the all important feature, the orderly resolution of complicated problems into simple elements which can be clearly and distinctly known, clearly corresponds to the method of analysis described in the second rule of the Discourse. The correlative process of synthesis, described in the rule immediately following, which reverses this order, would seem by him to be considered
less important, and more in the nature of a convincing expository device than a fruitful method of discovery. Thus it is with his use of the analytic method — his avowed intention within the Meditations * — that our consideration of the mathematical structure of his metaphysics will be primarily concerned.

The two requirements of intuition made evident by the double mode of distinction, from deduction on the one hand and enumeration on the other, are that it be clear and distinct apprehension, and apprehension all at once not successively. For the solution of the metaphysical problems he has set himself his first search must be, accordingly, for a self-evident truth intuited in this manner.

Two further characteristics are required of the primary intuition forming the starting point of metaphysical deductions. It must be an absolute, and it must be "real being". He points out (Rule VI. p. 26) that some simple natures may be absolute from one point of view, yet relative from another. For metaphysics, the certain science par excellence, however, nothing less than the maxime absolutum is adequate. This must be not an abstract proposition,

* "Now in my Meditations I have used only analysis, the truest and best method of teaching, the synthesis you are asking me to use ... cannot be so suitably applied in these metaphysical disciplines. For ... nothing is more difficult than making clear and distinct our awareness of its primary notions."

Reply to Objection. 2.
or universal, (the use of which in Scholastic logic he is criticising) but a "being the existence of which is better known than that of any other." (Letter to Verelieer.)

In order to discover the extent to which Descartes was able to transfer an order of proof and reasoning from mathematics (which is concerned with homogeneous entities) to metaphysics, we turn now to examine in detail the structure of the *Meditations*, the work in which he explicitly endeavours to prove qualitatively different things – God, the self, material existence. In accordance with one of the primary injunctions of his method, Descartes begins with a *Synopsis* in which some indication is given of the way in which the complex problem – the demonstration of the existence of God and the independent existence of mind and body – may be reduced to simpler problems, whose solution will aid the resolution of the complex. In regard to the immortality of the soul, for example, proof of which is taken to follow necessarily from that of the independent existence of mind and body, he explicitly adopts "an order similar to that used by the geometers", and states first the premises upon which the truth of the proposition must depend. The proof is not complete at the end of the Second Meditation because the ability to form a perspicuous apprehension of the soul distinct from that of the body, although one such important premise, is not in itself sufficient. It is
further necessary to be assured "that all things we judge clearly and distinctly are true in that very mode in which we are judging them," and also "that we have a clear distinction of the corporeal". On these grounds alone can we draw the conclusion in the Sixth Meditation that "whatever things are clearly and distinctly apprehended as diverse substances as are mind and body, are indeed distinct each from the other."

This explanation of the nature of the simpler problems involved is followed by his statement of the order in which they are to be discussed - an order which represents not necessarily their ontological status, but the order of epistemological discovery, since, as he always insists, the order of knowing is not necessarily the same as the order of being. That is why although God is the most intelligible being, and the foundation of all other being and existence, the proof of His existence does not occur until the Third Meditation, being preceded by the discovery of the existence of the self. Again, the simpler problem of showing the validity of our clear and distinct ideas must be treated prior to drawing the complete conclusion of independent existence of mind and body. This conclusion cannot be drawn immediately at the end of the Second Meditation as one might think, just because, when philosophising in order we must necessarily pass through the stage of doubting that
the clear and distinct idea we have formed of the mind has any real validity.

Apart from this preliminary survey, however, the more detailed reduction of complex to simple problems proceeds in the course of discussion. In following the methodological search for the self-evident datum, the "atom of evidence" which will furnish the starting point of all knowledge, we are at the same time enabled to see more clearly what precisely Descartes meant by the simplification of problems. Obviously to attempt to carry this out exhaustively before beginning the actual voyage of discovery would be to presuppose the very point at issue. If the metaphysical demonstration itself is really a discovery, the correct reduction of the complex problems must be progressively achieved as the methodological search proceeds.

The Meditations commence, in accordance with the structures of the method, with a survey and enumeration of all previous beliefs. The nature of the enquiry enjoins a twofold doubt. We may doubt not only of the evidences of the senses, one's instinctive beliefs cherished since childhood, etc., but also of the self-evident truths of mathematics themselves, just because these too are hypothetical and do not, therefore, furnish the starting point needed in metaphysics. The removal of prejudice, described in the Regulae as the sine qua non of the clear functioning of intellectual
vision, thus represents the first stage of the method, carried out in the First Meditation. The different beliefs are classified and examined, that class of truths held in highest esteem, even, being subject to the most rigorous form of doubt - the only form of doubt open to them, in fact, based on the hypothesis of the malignant demon. This form of classificatory analysis having been carried out, the ground is prepared for the more positive aspect of the method involving the functioning of direct intellectual insight no less within the deductive chain of reasoning than in the clear perception of the primary metaphysical datum itself.

The Meditation upon the nature of the human mind with which the second phase opens, resolves the first problem presenting itself to orderly thinking, namely, whether certain knowledge is possible; whether there is any piece of true knowledge of which it is impossible to doubt. Even the malignant demon cannot exorcise this conviction - indeed, he but serves to strengthen it - *Cogito, ergo sum,* or *Dubito, ergo sum.*

The intuition, however, seems not yet to be complete,

---

* The new translation by N. Kemp Smith puts this in the less misleading form "ego sum, ego existo," avoiding thereby the misplaced objections concerning the "ergo," which would seem to make the existence of the self an inference rather than the direct intuition which to Descartes it essentially is. Having recognised this point, however, the present discussion will retain the traditional and familiar terminology.
for the question immediately arises, "What am I?" This enquiry, in turn, is carried in the same orderly and classificatory manner as that concerning what one may doubt. It is important to recognise the continuity of this argument, as the Cogito itself is frequently interpreted as Descartes' First Principle. In one sense it is, being the first indubitable proposition reached when philosophising in order. The very fact that it is but a proposition, however, suggests that Descartes did not intend the Cogito, as it stands, unexamined, at this point of immediate and momentary discovery, to suffice as the self-evident datum from which all subsequent knowledge is to be extracted. It is far too abstract to act as the fruitful principle his method seeks. The significance of the Cogito lies rather in its position in the Meditation - its introduction at this point presents something, the bare existence of the self, for further analysis, it being by means of such analysis of its nature that we can alone attain a clear idea of a "being" which can serve as the metaphysical First Principle. Accordingly, Descartes sets out upon this analysis in the same Meditation. The orderly nature of his programme can be seen from the paragraph with which it commences.

"But I do not yet know in any adequate manner what I am, I who am certain that I am; and I must be careful not to substitute some other thing in place of myself, and so go astray in this knowledge which I am holding to be the most certain and evident of all that is knowable
by me. This is why I shall now meditate anew on what, prior to my venturing on these questionings, I believed myself to be. I shall withdraw those beliefs which can, even in the least degree, be invalidated by the reasons cited, in order that at length, of all my previous beliefs, there may remain only what is certain and indubitable. (Meditation II. p. 203.)

After examining and rejecting all that he had formerly believed himself to be, as insufficient to disclose his true nature, perceiving that none were inseparable from his being in the way that thinking was, he finally reached his bedrock of certainty: he is a thinking being. It is at this point only that he attains the sought-for first principle, at once a "being" and "better known than all else".

The methodological doubt, as a result of which the Cogito was the first truth to be discovered, served to indicate precisely the point in reality at which the direct examination into particular concrete truth - the only fruitful method of discovery - should be carried out. The next stage in methodical reasoning, therefore, consists in a meditation upon the nature of the self, the res cogitans.

"Before tackling any specific question, we ought to ponder at length and impartially those truths which have of themselves presented themselves to us, and starting from them to enquire whether others can be reached by way of them, and again others from these and so on in orderly sequence . . . "
(Rule VI. p. 28.)

Thus, upon this primary intuition of the existence of a self which is a "thinking thing", it is ultimately hoped to base, in strict deductive sequence, the propositions he
has set himself to prove: that God exists, and that the soul is distinct from the body. As the Synopsis pointed out, the first requirement in the movement towards the demonstration of the second of these is to form a clear and distinct idea of each of the things to be distinguished. This he carries out in the remainder of the Second Meditation, reaching the well-known conclusion that a clear and distinct idea of the mind is more easily formed than that of the body; that the mind is more easily knowable than the body.

At this point the argument takes another form, since the conclusion so far reached does not suffice to prove the mind's actual distinction of the body unless we are somehow assured that our clear and distinct ideas are reliable. To extend our knowledge from the first certainty we have reached we must be assured of the validity of the method itself. For

"In this first knowledge there is indeed nothing save the clear and distinct apprehension of what I am affirming; yet this would not suffice to render me certain of its truth, if it could ever happen that anything which I apprehend thus clearly and distinctly should yet prove false:"

(Meditation III. p. 213.)

The "general rule" apparently suggested by the Cogito - that everything clearly and distinctively apprehended is true - can, the, only be adopted tentatively. That is why, following the strict order of reasoning, Descartes
must at this point leave for a moment the direct consideration of the demonstration of mind's separation from the body, in order to introduce the second problem, that of the existence of God, the proof of which proposition is required before the earlier argument can advance further. We have to be assured of the existence of a benevolent God, since this alone can serve to remove the doubt cast upon the truth of clear and distinct ideas by the hypothesis that there is a malignant demon deceiving us. This is not to say that he finds the truth of such ideas intrinsically doubtful — it is only the hyperbolical doubt which can lead us to question them. The search for certainty demands the rigours of even such extreme doubt. *

The nature of Descartes' starting point has rendered this problem the more acute: Knowledge arises out of the inspection of the res cogitans, but so long as we can be sure only of the existence of the thinking substance, the ideas, by the examination of and meditation upon which we would extend this knowledge, would seem to be cut off from

* "And certainly since I have no reason to believe that there is a God who is a deceiver . . . the ground of my doubts, entirely dependent as it is on this supposition, is but slight, and so to speak metaphysical. But to be able to eliminate it, I must at the earliest possible opportunity inquire whether there is indeed a God: and should I find there is a God, I must also inquire whether He can be a deceiver. For without the knowledge of these two truths I do not see how I can be certain of anything."

Meditation III.  p. 215.
reality. Our initial intuition cannot be further developed nor enable us to reach more complex truth unless the coincidence of ideas and reality be demonstrated beyond their momentary coherence exhibited in the *Cogito*. This is precisely what the proof of the existence of God, necessarily introduced at this point is required to do. Nor is there any vicious circle immediately involved in thus interrupting the proof of the first proposition, the independent existence of the soul, by the consideration of the second. Descartes' method neither states that problems must be completely solved in strict isolation the one from the other, nor denies the possibility of their reciprocal development.

Not wishing, however, to interrupt the strict order of meditation, he again starts from the investigation of some aspect of the self, this time dividing and classifying the different kinds of thoughts he discovers within his own mind. The rigour of the method demands that the ideas themselves be examined, since their "objective reference" as yet being in doubt, the only proof of the validity of the more complex truths attained by their means is that they bear in themselves evidence of an external reality. This is why the first, and for Descartes the most important, proof of God's existence turns upon the point whether the idea of God in Descartes' mind necessarily bears the imprint of His creation: whether it could proceed from any source other than God Himself.
In the course of examining many ideas which seemed to come from things outside him, Descartes had perforce to conclude that the grounds upon which he had previously believed in their external origin were not very good; "a sort of blind impulse" rather than any "assured judgement" has constrained him to think thus. He must, therefore, adopt another method of enquiry, asking whether amongst such ideas themselves there may not be a degree of "inequality", some containing "more objective reality". If he can find some idea (or ideas) which is, in the Cartesian terminology, a "mode of existence" of the object, and not simply a "certain way of thinking", then he can be certain, in virtue of marks proper to such ideas alone (i.e. without begging the vital question) of existents external to himself. The gap will be thus bridged between the ideas in the mind and things outside it. The idea of God, as of nothing else, he finds, does have such a mark of assurance.

"... The idea by which I apprehend a supreme God, eternal, infinite, immutable, omniscient, omnipotent, and the creator of all things which are in addition to Himself, has certainly in it more objective reality than those ideas by which finite substances are represented.

(Meditation III. p.219.)

The idea of God, then must have a cause. This cause could not be himself, he continues, because it includes all perfections and excludes the imperfections he recognises within himself. "Now it is manifest by the natural light,"
he adds, "that there must be at least as much reality in the
efficient and total cause as in its effect . . ." From
which he concludes "not only that something cannot proceed
from nothing; but also that what is more perfect, i.e. con-
tains more reality, cannot proceed from what is less perfect."

The final conclusion he draws from these points, duly
elaborated in succeeding paragraphs of the Third Meditation
is that, the objective reality of one idea having been found
to be so much greater, and of such a kind that he cannot be
the cause of it, he cannot be alone in the world, but that
there is some existing thing causing this idea. The in-
nate idea of God must be implanted by Him in His creature
"as it were the mark of a workman imprinted on his work."
With this discovery, he has finally exorcised the demon,
and removed the potential grounds of doubt concerning the
real reference of our reason and of the validity of the cri-
teron of knowledge it presents to itself.

Being thus assured of that upon which the methodology
had itself cast doubt, of the possibility of metaphysics as
a science giving certain knowledge, by the fact that the
clear and distinct propositions in which it is formulated
are shown to be necessarily true, the next step must be to
ascertain more clearly those things of which true knowl-
edge is possible. Before doing so, however, he pauses
in the Fourth Meditation to take up a further problem
created by his doctrine. * The existence of error, he observes, would seem inexplicable in the light of his insistence upon the mind's natural capacity for unerring and certain knowledge. The author of error cannot be God, moreover, since the preceding Meditation has shown that He is not a deceiver. Thus, all clear and distinct awareness being necessarily true, the source of error must be sought elsewhere than in either God, or the human intellect taken in itself. In short, it is found in the uneven co-operation of will and understanding, the freedom of the former exceeding the power of the latter. Once this has been recognised, his argument can proceed since the fact of error need not undermine his previous reasoning, serving merely to impress upon him the need ever to direct his attention to those things only which he sufficiently understands,

* This problem becomes confused, moreover, with the problem of evil on account of the certain knowledge which is assumed to be man's "natural right". For whereas Medieval philosophers - St. Thomas, for instance - had not been especially worried by the problem of error, since its existence was in accord with their conception of science ("probable knowledge") and of the nature of man (fallible) Descartes' theory of knowledge constrained him, as Gilson has pointed out in some detail, to extend St. Thomas's teaching concerning sin to the problem of error. In Descartes' thought, the "probable" and the "false" were confused; taking mathematica as the pattern of all knowledge, "la présence de l'erreur devient un scandale, et si par hasard elle se trouvait invincible, il y aurait lieu d'en faire une juste reproche à l'impuissance du Créateur ou à sa malice... Ainsi la différence qui sépare la doctrine de l'erreur chez St. Thomas et chez Descartes mesure leurs exigences en matière de certitude".

separating them from those apprehended but confusedly and obscurely.

We are now brought, in the same orderly manner, to the penultimate stage of the metaphysical argument. The Fifth Meditation affirms that we can in fact form clear and distinct ideas of material things, as well as of minds. This same Meditation also discloses to him a second proof of the existence of God, and so more fully the way in which "all knowledge depends on knowledge of God, without knowledge of Whom no perfect knowledge of anything else would be possible." The proofs of God, as given both here and earlier, reflect back and confirm the preceding truths, as he pointed out in the Synopsis, rehabilitating with complete surety not only the objects of pure mathematics, but also confirming that we can have perfect knowledge of corporeal nature.

This conclusion leads him into the Sixth Meditation, beginning with the enquiry concerning the existence of material things, and culminating in the demonstration of the real distinction of mind and body. Despite this verbal ordering of the Meditation, however, it is soon apparent that the actual existence of material bodies is not necessary before, and in order to determine, the real distinction of mind and body. The reverse is rather the case, the real distinction of mind and body preceding, and being required for the proof of material existents. The important
point to be proved, therefore, is that mind and extension are attributes of substances, which alone are, by definition, capable of existing per se, and between which, in consequence, a real distinction obtains.

This he does, again systematically step by step. First, the difference between imagination and pure intellect is "made plain" the conclusion being drawn from this that imagination does not belong to the essence of mind as does the intellect. The more "probable hypothesis" seems, he continues, to be that imagination is carried out by the body - from which he "conjectures" that the body probably does exist. But since, in this case, imaging depends on the existence of the body, the existence of bodies cannot itself be derived from a clear and distinct imaginative idea of the body itself, he must try again by turning to sense perception. For, although one must not rashly admit all the senses appear to teach, they need not, thanks to God's benevolence, all be called in doubt.

It is at this point that Descartes' argument changes, as remarked above, and the notion of substance is introduced, from which the real distinction of mind and body, and existence of material objects, alike will follow. The existence of God having been proved, we can be sure, he says, that if things are apprehended as clear and distinct, they are so different. We already know that the self is a
thinking being, "i.e. a substance, the whole nature or essence of which consists in thinking." But he finds also "faculties of thinking which are quite special modes of thinking, distinct from myself, viz. the faculties of imaging and sensing:" which, he insists, are equally unintelligible without the notion of substance, that is "without an intelligent substance in which they reside." It follows from the nature of sense and imagination already indicated, their real distinction from the mind, that this second substance is corporeal. Thus he has reached the desired conclusion, that bodies do exist. Correlatively, the real distinction already admitted (via God's veracity) is transformed into a true demonstration that mind and body as actual existents are distinct; the proposition he set out to prove.

At this point we may leave this analysis of the structure of the Meditations (it being unnecessary for the present purposes to discuss the succeeding and perhaps somewhat irrelevant and drawn-out paragraphs with which he closes). Sufficient evidence has, I think, been provided by the form of his reasonings to show that they were quite clearly conducted along the methodological lines prescribed in the Regulae and the Discourse. It remains now to enquire the respects in which he did, in the course of argument, include assumptions not warranted on strictly
mathematical principles, and in various other points of detail indicate some of the essential limitations of his chosen "analogy". To this we proceed in the chapter immediately following.

The examination of Descartes' employment of "mathematical method" within his metaphysics falls into two parts. First, the nature and scope of his metaphysical first principle may be compared with the self-evident intuitions of mathematic. Secondly, one may enquire to what extent the subsequent deduction was carried out on strictly mathematical lines.

It must first be noticed that Descartes' own epistemology has undergone some development and codification between the drawing up of his first charter of intellectual freedom, the Meditation, and his more strictly metaphysical writings, the Meditations and the Principles. For instance, in the former, the self-evident truths (simple natures) of which he speaks are numerous, and, indeed, the Cogita is referred to as but one of the many such indubitable truths. This, however, does not necessarily indicate a contradiction between the application of the method within his metaphysics and its initial formulation, but rather bears out Descartes' own insistence (often overlooked) that his method is not something static, to be "learned" and then medi-
CHAPTER VIII.

SOME SELF-EVIDENCED LIMITATIONS
OF DESCARTES' METHOD.

The examination of Descartes' employment of "mathematical method" within his metaphysics falls into two parts. First, the nature and status of his metaphysical first principle may be compared with the self-evident intuitions of mathematics. Secondly, one may enquire to what extent the subsequent deduction was carried out on strictly mathematical lines.

It must first be noticed that Descartes' own epistemology has undergone some development and modification between the drawing up of his first charter of intellectual freedom, the Regulae, and his more strictly metaphysical writings, the Meditations and the Principles. For instance, in the former, the self-evident truths ('simple natures') of which he speaks are numerous, and, indeed, the Cogito is referred to as but one of the many such indubitable truths. This, however, does not necessarily indicate a contradiction between the application of the method within his metaphysics and its initial formulation, but rather bears out Descartes' own insistence (often overlooked) that his method is not something static, to be "learned" and then mechani-
cally applied. Nor was its formulation based upon purely abstract considerations, but, as he himself tells us, upon the observation of reason at work and making fruitful discoveries within the sciences. Moreover, although his initial inspiration was derived from his mathematical and physical researches, it seems unlikely that he intended this conception of method to remain unaltered by his subsequent metaphysical reflections, but to develop side by side with the latter. The really constant feature lies in the doctrine concerning the natural potentialities of the human mind, "sagacity" and "perspicacity", to the cultivation of which his rules of method were intended as an aid.

The outstanding difference between mathematical axioms and his own metaphysical first principle becomes immediately apparent in Descartes' account of the mode of attaining the latter. The methodical ordering of the initial complex data is important as enabling the mind to attain the maxime absolutum being sought. The features demanded of this metaphysical first principle, in virtue of which alone it could be a fruitful source of new truths, suggests that the supreme object of intuition within this enquiry is not in fact strictly analogous to that of mathematics. Such a divergence is not, moreover, on the same plane with the legitimate development of the rules of method above referred to, since it introduces "alien" elements into what purports
to be strictly mathematical demonstration, and so lends to his conclusions a force not on his premises warranted.

Mathematical intuition is concerned with universal relations between ideas. Its certainty derives from the logical nature of these relations; that is, it is a function of two significant features of mathematical reasoning - no reference to the "real" is made, and no "time factor" is involved. Nor does the "discontinuity" between intuitions making up a chain of discursive reasoning present problems for mathematics itself, being thus indifferent to the question of its applicability and the objective truth of its axioms.

Descartes has insisted that the first intuition in metaphysics, on the other hand, must be of a concrete "being", not an abstract axiom. For metaphysics is concerned with giving knowledge of real existence. Moreover, whilst the clear and distinct axioms which he is taking as his mathematical pattern are universal propositions, Descartes maintains, as against traditional logic, that metaphysical knowledge is not to be obtained by deducing particular truths from universals: that the particular can itself be directly and intuitively known. Hence the one item of indubitable knowledge disclosed by the methodological doubt was a concrete particular, at once real and ideal. The content of this unique intuition, then, whilst illustrating the need to
begin from existence, and bearing out the truth emphasised by St. Thomas that existence entails individuality, is manifestly inconsistent with Descartes' alleged model of reasoning. Hume, for instance, is more consistent to a mathematical view, when although formally denying universals, he builds his world out of objects very like universals in so far as he neglects individual substance and recognises only impressions and ideas.

The existential nature of the primary intuition is emphasised by Descartes in order to meet the charge of circularity levelled against the certainty of the Cogito (2nd Objection). He always maintains that immediate awareness, at the moment of its occurrence is infallible. In this respect all ideas or essences are equally indubitable. Doubt only arises in one or other of two important cases; ideas are open to doubt either when they are used within judgements concerning what is eternally true, or when they are regarded as representative of actual existents.

The Cogito escapes indictment on the latter count, because it is not a representative idea, nor is it inferred, being a direct insight into a meeting point of real and ideal. Yet, this frees him from circularity only at the expense of taking him away from the mathematical analogy strictly conceived. For, as already seen, the Cogito is not strictly analogous to mathematical axioms; it is itself
"concrete" and leads to "concrete" conclusions. There seems, in fact, to be no analogy between the intuition of mathematical propositions and the self other than the possession of the common characteristic of "immediacy" — which is a tautology!

It is also free from the first in so far as it is only of a "momentary self" that immediate awareness is claimed. This is a position to which, however, Descartes cannot adhere with complete consistency. For he has himself maintained that a judgement which expresses no more than momentary experience, although so far infallible, does not afford the basis for true knowledge; it suffices for "persuasion" but not for science, the latter demanding assurance of the continuity of these independent instants and the pieces of knowledge thus apprehended. Descartes must either consistently maintain that no scientific knowledge is possible before the existence of a benevolent God is proved; or, alternatively, he must give further content to the self, invoking assumptions which form no part of his method, since a momentary self is not adequate to form the foundation, the starting point of all knowledge. The adoption of the first of these leaves him still open to the charge of circularity, and the second to that of resting his deductions upon un-criticised assumptions, the rejection of which constituted the first stage of his method. He seems, in point of fact,
to oscillate between the two positions.

He points out in his reply to the second objection, that being already true of reality, God cannot make this first metaphysical intuition more real but can only show it to be an isolated aspect of reality which has been abstracted, in the knowing process, from a reality upon which it is ontologically dependent. It is in this sense that the first principle of Descartes' metaphysics is in fact not the self (even in the more precise sense of "thinking thing") but God, as is shown by the form of the Principles. The primacy of the Cogito in the Meditations lies in the order of discovery when pursuing the analytic method. The self thus disclosed is not a continuous self, but, like any existence in time, can only be achieved indirectly through the guarantee of God. Consequently, no scientific knowledge can, without circularity, be based upon it. Yet the analytic method was proposed as the means of discovering the maxime absolutum upon which the development of subsequent knowledge is founded.

The alternative position indicated above is seen most clearly in respect of his application to the self of the Scholastic notion of substance. For awareness of the self is distinguished from the intermittent awareness of other natures by the fact that the Cogito is an ever-present intuition, apprehended in every operation of the mind. In
order, therefore, to account for the continuity of the self perceived in even the instantaneous acts of thinking, he posits an active substance of which thinking is an attribute. His reasoning seems to have been, briefly, thus: the self, although given in primary awareness, is so far a complex fact, requiring more careful analysis (according to the rules of method). Existence is indefinable, he says, but the qualitative self may be analysed into elements. The resulting simple natures, he then concludes, will be qualities of a substance, the nature of which they are thus revealing. The one-attribute theory of substance which Descartes assumes leads us yet a step further in the direction of the conclusion that the self is a "thinking substance". But this procedure so far is unlike the original method, which was strictly a means of discovering logically necessary relationships between items of knowledge. Such relations being not discoverable between the various elements of the mind - thinking, willing, doubting, etc. - Descartes therefore turns from the judgements of relation which his method, on the mathematical pattern, originally disclosed, to judgements of attribution, which belong to the syllogistic reasoning which he had supposedly rejected.

Without digressing into more detailed consideration of Descartes' doctrine of substance, it is already evident that its introduction at this point, integral to one line of
argument which he adopts, has taken him away from the mathematical way of thinking. It enabled him, moreover, to give "richness" to his first intuition, by defining the substance-self in such a way that the desired epistemological conclusions could be drawn from it.

"What is a thinking thing? It is a thing which doubts, understands, affirms, denies, wills, abstains from willing, that can also be aware of images and sensations.
(Meditation II. p. 206.)

In this description (as likewise in the content given to the idea of God) he seems to include all the features upon which doubt had hitherto been cast, so that it may not unreasonably be complained that he begs the question, this being precisely the reason why he can deduce so much from his first principle; that it is the explanation of its seeming fertility in providing the source of new truth. Moreover, he assumes that these aspects of the self form a genuine unity. But this is not only an assumption which is far from being so clear that it only requires to be stated in order to be accepted: it is one to which his mathematical premises do not entitle him. The criticisms levelled by Locke and Hume reveal this, and demand, with justifica- tion, some further defence of this contention. Locke's criticism of the confusion of "an obscure and relative idea of substance in general" with "ideas of particular sorts of substances (Treatise on Human Understanding, II, xxiii, 3.);
together with his query as to why the "ego" possesses just these attributes and supports them in a unity, are unanswerable in terms of a mathematically orientated theory of substance. If we introspect in an "external" (quasi-scientific) manner - Bergson's "transient glimpses" or "cinematograph" shots - we can, as Hume pointed out, never catch ourselves without a perception, and can get no further than a statement of the de facto union of the properties we do find. Man doesn't come to know himself as a unity of doubting, fearing, willing, choosing, etc., by knowing himself primarily as a being one could study with detachment, but faced with physical and psychical demands made upon him, with human contacts etc. But these are features of experience which Descartes on his mathematical premises, together with the dualistic and "isolationist" implications he draws from them, must push into the negligible background.

Lastly, in respect of the objects of intuition, one further divergence of the metaphysical from the mathematical conception may be noted; a divergence having no less far-reaching implications. An important reason for the certainty of mathematics lay in the simplicity of its objects. Accordingly, on analogy with the ultimate objects of mathematics the basic constituents of all human knowledge are described as "simple natures" (in the Regulae) or, in his later terminology, "principles", characterised in like
manner by their simplicity. The analogy is, however, in this instance misleading. The adjective "simple" as employed in his philosophy, is not used to exclude the possibility of internal complexity. It is rather a synonym for unity, and as such "a condition favourable to internal complexity and not its antithesis". The emphasis in Descartes' theory, and that in virtue of which the simple natures are asserted to constitute the true foundations of certain knowledge, is laid upon their fruitfulness. This feature, although their chief distinguishing mark, is not strictly mathematical. That the simplicity of the metaphysical intuition and the relation of simple-complex is not identical with that of mathematics is seen from his own metaphysical example of a simple nature - the self. Clearly the idea of God does not stand to the idea of the self, and cannot be drawn out of it, in precisely the same way in which in mathematics a polygon is related to a triangle, and in which complex problems concerning polygons can be solved by their reduction into terms of triangles.

The supposed parallel with mathematics also suggests, misleadingly, that the simple natures are completely isolated.

* N. Kemp Smith, New Studies, p. 8. This author points out that this is a Thomistic use, and one which enables the simple ideas to play a very strange mediating rôle between his mechanical view of nature and his non-mechanical conception of both the self and God.
and independent of one another. Thus to Spinoza, for instance, it appears an abortive enterprise to seek to construct a system of knowledge on the basis of these discrete ideas. This indeed proved one of the chief grounds upon which Spinoza rested his criticism of the impotence of Descartes' logic as a method of discovery, and upon which he justifies his own alternative procedure. The passages in which Descartes is most expressly adhering to the mathematical analogy do support such an interpretation. In Rule XII (Regulae) for example, he gives a somewhat atomistic account of simple natures. This is not, however, consistent with his views of inference and the doctrines of "substance" as they appear in his strictly metaphysical writings of the Meditations and Principles. Within the latter at least his designation of the ultimate limits of analysis as "simple" does not necessarily imply that they cannot mutually influence and enter into relations with, one another, in such a way that their distinctness is transcended, the system as a whole becoming the object of a new (complex) intuition.

In short, the comparison of the prominent features of intellectual intuition within metaphysics and mathematics respectively reveals some of the limitations of the mathematical method illustrated in Descartes' own philosophical writings. The extent to which non-mathematical assumptions
and forms of reasoning are similarly introduced into the subsequent deductions remains to be considered.

The first significant feature in respect of which the discursive reasoning of his metaphysics differs from that of mathematics is that it (metaphysics) must justify its own procedure. It seems likely to suppose, accordingly, that this requirement will introduce problems which are non-existent for mathematics and detract from the strictly mathematical ordering of the philosophical arguments. Not only has it (as must all epistemologies) to justify its own point of departure, and in this sense inevitably involves a circle (which is not, of course, necessarily vicious); it must also take into account the question of why a logical train of reasonings should be a true transcription of the real. Descartes had to account for the element of necessity within the new scientific laws (their being mathematically formulated). The empirical fact alone that mathematics could be applied, with fruitful results, to the physical world, could not provide the a priori certain demonstration of the rationality of this procedure. Similarly, the application of mathematical method within his own philosophy demanded more precise justification than mere pragmatic guarantee of the objective reference of clear and distinct ideas. Thus the order of his proofs of the existence of God and the independent existence of the soul is
necessarily complicated by the fact that he is committed at
the same time to showing that we have minds capable of know-
ledge, and that the constitution of things is such that they
can be known. This, in Cartesian terminology, involves
showing that we have clear and distinct ideas which are
true, and that reality is compounded of "simple natures"
which can be apprehended in thought.

The need for metaphysics to justify its procedure led
Descartes to introduce the proofs of God in the Third Medi-
tation, before making full use of the criterion of truth
suggested by the first piece of knowledge already attained.
This serves, however, to raise in a new and acute form the
problem of how, if God is the foundation and sanction of all
truth, circular reasoning is avoidable when certain standards
of truth seem inevitably to be taken for granted in this
discovery.

The charge of circularity is the most grave that can be
levelled against a philosophy professing, as Descartes' does,
to adhere to a strictly linear order of proof. * The soul's

* Thus Descartes is here presented with a problem in a way
in which Spinoza is not. For this reason, it has been re-
marked by one writer that "Curiously enough, it is Descartes
rather than Spinoza who has shown most clearly the futility
of a constructed system. Spinoza . . . used the form of a
deductive system in order to exhibit his vision of the uni-
verse. I see no reason why he should be dismayed at the
charge of circularity; there is no reason why he should
not wrap up his definitions and axioms all that he desired
immateriality, for example, he has therefore insisted, is proved only in the Sixth Meditation, the Third, Fourth, and Fifth Meditations no less than the Second, being necessary, and leading up to, this conclusion as it is finally demonstrated. Although, as was seen, to some extent breaking the analogy with mathematics, the alleged circularity of the cogito could perhaps be evaded by insisting upon its non-inferential character, its immediacy as well as its uniqueness of status. This would, however, seem to be an impossible line of defence for any propositions involving a chain of inference. And as Descartes repeatedly denies the possibility of direct knowledge of God, the proof of His existence can be regarded in the nature of a test case.

The challenge may take two forms. It may be objected that, as Gassendi put it,** Descartes argues to the existence of God from the clear and distinct idea which he has of Him, despite the fact that their validity depends upon His existence. Alternatively, it may be pointed out that the idea of cause plays an important rôle in the proofs.

---


** 7th Objection.
although it, like all clear and distinct ideas, must logically remain in doubt until God's existence has been demonstrated.

In contradistinction to what has been said, however, Kemp Smith in his *New Studies* maintains that Descartes can meet the charge of circular reasoning in the case of God no less than in that of the *Cogito* by insisting upon the immediacy of the experience. This, he says, according to Descartes himself, is the only evidence appealed to in the demonstration of God's existence.

"The reason why, in this instance and in no other, demonstrative proof has been possible, by way of such evidence, is the uniqueness of the immediately experienced idea of God. It is an essence no less unique among essences than the existence of the self is, for each self, unique among existents. Thanks to its uniqueness, as also to the immediacy of our apprehension of it, we can by way of it with no other aid than that of axioms apprehended in the same sheerly immediate manner, obtain proof of God's existence. Thereby we establish what, prior to such proof, remains open to doubt, viz. the conclusion that, provided the immediately experienced is being apprehended distinctly as well as clearly, what is true of it holds true in all cases not merely for the moment but immutably."

(N. Kemp Smith, *New Studies*. p. 274.)

This method of absolving Descartes from the charge of circularity does not seem to me convincing. Having denied the possibility of direct knowledge of God, he can only come to know Him through the idea; but the necessary inclusion of existence in this idea of God forms the basis of the ontological proof, which does not appear until later.
Although Descartes finds the latter convincing, he says, even if all the others were discredited, its immediacy of content cannot be used in support of the validity of the earlier proofs. Moreover, to rest too much on the "immediacy" of the apprehension is contrary to the method. For instance, the distinction which Descartes draws between things clearly and distinctly conceived and those remembered to be such, avoids the circle by making the guarantee of God apply not to the idea itself but only to the soundness of our recollection. But the problem which the existence of God is called upon to solve is not simply the uncertainty introduced by memory, but the fashioning of the clear and distinct links in the chain of demonstration, by means of which it is the professed intention of the metaphysics to prove the existence of God.

The main difficulty of this line of defence, in short, is not that the claim for the certainty of clear and distinct ideas at the moment of apprehension is an arbitrary limitation of the doubt, by which we escape from the circle "at the expense of cheating the wicked genius". (Gibson). For that claim is but a consistent application of a position to which Descartes has held throughout - namely, that the immediate awareness of instantaneous and non-representative ideas is always certain. It is its use for defending the demonstration of God's existence which seems unfeasible.
Such momentary ideas, on Descartes' own showing, do not give scientific knowledge. The idea of God so justified by its "immediacy" would be far too meagre to constitute the God required by his argument. And to suggest that the existence of God so established can then guarantee the immutability of all that is clearly and distinctly apprehended, including his own existence, is no less circular. It may be suggested that the appeal to God's not being a deceiver, in order to establish the validity of man's reason, is not a circular argument if interpreted as the assertion that the validity of our reason in telling us about the nature of things, and the existence of an objective Reason in things themselves, as Plato indicated, stand or fall together. But although true, this does not absolve Descartes himself, since it is not an argument of the sort Descartes was purporting to provide: he professes to be demonstrating with certainty the validity of Reason, not merely "asserting" or "witnessing".

It follows, accordingly, that Descartes is equally open to the second form of the criticism: that of having illegitimately assumed the causal axiom in both the first and second proofs. Defence on the ground of "immediacy" by which the axiom is apprehended is here even less convincing.

* As for example by E. H. Locock, in Whitehead's Philosophy of Organism.
for the question does not concern the starting point, but the process of reasoning itself; the logical assumptions by means of which he passes from the starting point to the conclusion. This problem is never faced by Descartes, because he does not question his right to use the causal axiom, which is perceived by "the natural light".

Assumptions unwarranted by his strictly mathematical premises likewise make their appearance at many points throughout his argument. These serve further to elucidate the manifest difference between mathematical proof which is concerned with homogeneous entities and his metaphysics in which he tries to prove qualitatively different things; God, the self, material existence. The most noteworthy examples of such extraneous assumptions occur in the proofs of God, and may be summarised with reference to these.

In addition to the over-all assumption that there is one cause of all that exists, the first proof rests, more specifically, on the dogma that there must be a cause of the objective reality of our ideas; upon the teaching of "natural light" which discloses that the cause must contain at least as much reality as the effect; and finally, upon the notion of Perfection contained in the idea of God. The Scholastic origin or influence is evident throughout. Most significant, however, is the concept of an idea having "objective reality" (of which the idea of God is the supreme
example). For this is clearly not a scientific notion, but is rather contrary to the general tenor of the method. It signifies not homogeneity, but rather suggests that there are regions of knowledge not amenable to the same methods; it is, in effect, presupposing a principle of causality in which the cause is not homogeneous with, but greater than, the effect.

The second proof, starting from the real existence of the self, is concerned with the need for an efficient cause, and takes the form "if God did not produce me, who did?"

Throughout this discussion it is clear that Descartes never considers the possibility of an evolutionary theory of man, but bases his enquiry as to the possible origins of the self upon the assumption that man must have been created. Consequently, even the hypothesis of the malignant demon, as Kemp Smith points out, fails to be very disturbing, since the terms in which he is conceived do not dispense with a doctrine of creation. * Thus three more specific assumptions - again largely Scholastic in origin - are introduced into this argument: that I am now, but once was not, and

* "The orthodox reader is therefore not unduly perturbed; the dice, as he recognises, have been loaded in his favour and he is therefore not unwilling to join in the game ... For what he is professing to establish is that a non-theistic account of man's origins, however formulated, is not genuinely possible."

N. Kemp Smith. New Studies. p. 297
that, moreover, the discreteness of the self as intuited demands a theory of continuous creation to render intelligible my claim to be a permanent self; that something cannot be created by nothing (ex nihilo nihil fit); and finally, the curious contention that it is more difficult to create or conserve a substance than its properties or attributes.

The ontological proof, which is given separately in the Fifth Meditation, falls into two parts. The minor premise, the particular fact upon which it rests, asserts that in this unique idea, existence is necessarily involved in the essence of God (again, it is an inherited dogma that the concept of a Supreme Being contains the idea of real existence). The major premise takes the form of a general principle that what belongs to the essence of a thing is always true of it. But this cannot logically give the real existence to which he concludes. For a petitio principii in the reasoning can only be avoided so long as the clear and distinct idea is not taken as interpreting the real.

Any indication of existence by those ideas being as yet subject to metaphysical doubt, the major premise can thus only apply to "essential" and not "real" truth.

The third proof of God's existence, then, further indicates the failure of his linear inference, commencing from a "part" (the self) and from it presuming to pass discu-
sively to the whole (God). The existence of God cannot be contained within, or derived from, the self without begging the important question. The real certainty of God, for Descartes, is in the end intuitive,* a knowledge of the greater being presupposed by that of the less. To know the self as defective, even, demands that it be known not in itself, but rather as a part of a broader system. To acknowledge this, however, and to interpret the circularity in his argument as but an example of the reciprocity which is necessarily involved in all coherent systems, in contrast to the invalid circularity of linear inference, is nevertheless to assert that Descartes failed in his self-imposed task; that he failed to achieve the strictly mathematical demonstration of ultimate metaphysical truths.

No less do the proofs as a whole indicate that despite his optimistic reliance upon a mathematically-patterned method for freeing men from reliance upon uncritical beliefs, and enabling them to attain certainty in the highest knowledge,

* There is some ground for the contention that "Descartes pose comme des vérités de la foi, on pourrait presque dire comme des expériences religieuses, l'existence de Dieu ou l'immortalité de l'âme, avant de s'efforcer de les prouver par des argumentations ... Son analyse n'est point une analyse s'il ne doute jamais sérieusement des principes qu'il se propose de démontrer."

Serrus. La Méthode de Descartes.

Such a procedure was less pardonable for Descartes than for St. Anselm since he (Descartes) was professing to prove mathematically, not simply to formulate arguments for the "believer".
he had in fact little defence himself against the prejudices inherited from the thought of the past or of his contemporary "mental climate".

"En somme, c'est un philosophe de transition, beaucoup plus qu'un révolutionnaire absolu."
(Serrus. *La Méthode de Descartes.* p. 89.)

Nevertheless, the highly original attempt to develop his metaphysical thinking along strictly mathematical lines is suggestive in its very failures. For these do indicate more clearly the nature of the method of mathematics, and its ultimate limitations. That is to say, by the very defects of his own method, particularly where the latter has been exhibited on a grand scale, a philosopher may help to open men's eyes to its inadequacies, directing them to the manifest need to supplement and improve upon it. In this respect, then, Descartes may be said to illustrate the way in which philosophical systems so constructed are able to afford clearer understanding both of the field from which the analogy was taken, and of the resultant "abstraction", its implications and limitations, fulfilling the "critical function" of philosophy so defined and claimed.
In this and the following chapter we are drawing attention to some diverse consequences entailed by two interpretations and uses of the Euclidean model which differ in significant respects from that of Descartes. Thus the term "mathematical" as applied to the methods and ideas of Hobbes refers principally to the deliberately artificial nature of his first principles and supporting axioms (based upon a non-intuitionist conception of Euclidean mathematics) together with the "arithmetisation" seen in his "equality" theory of politics, whilst in respect of Spinoza, it pertains chiefly to the deductive method of exposition.

It may be remarked that, whilst mathematics itself is not for its own purposes necessarily confined to dealing with homogeneous units, it does have a "reductive" tendency in application, in its "vulgar" usage. This tendency is to be seen at work particularly in Hobbes.
CHAPTER IX.

ALTERNATIVE INTERPRETATIONS OF MATHEMATICAL METHOD.∗

The Cartesian problem of how to move from ideas to existent reality without involving a vicious circle in the reasoning, had been created by the metaphysical dualism of ideas and reality to which Descartes' method had itself led. Thus it seemed that a new technique of reasoning was required to overcome embarrassments created by this conception (and application) of mathematical method. The recommendations of Spinoza and Hobbes were focussed around the central need to overcome the difference of type between premises and conclusion which had afforded Descartes' chief stumbling block. Mathematics deals with homogeneous units. Likewise, the conclusions of a deductive chain of reasoning within mathematics are of the same abstract kind as the propositions forming their starting point. The true method of reasoning must, accordingly, be modelled more precisely upon that of mathematics, retaining the same homogeneous character within the subject matter, and between starting point and conclusion. In the achievement of this end, however, the respective methods of Spinoza and Hobbes, superficially so alike in their rejection of the metaphysical dualism,
differed considerably.

Spinoza's first amendment related to the starting point of the reasoning. Descartes had sought "simple natures" analogous to the principles of mathematics, from which the totality of knowledge could subsequently be built up, despite the qualitative difference between the initial ideas and the concrete reality to be attained by their means. According to Spinoza, this embodies two errors, the correction of which in both cases leads to the distinctive character of his own conception of method. The first, the attempt to build a "whole" of knowledge out of discrete ideas was self-refuting. Indeed, he points out, this inevitable collapse of his logic had been virtually admitted by Descartes in his ultimate appeal to revelation.

Spinoza could not consort with such irrationalism; to do so was contrary to the whole impetus of his nature, no less than the fundamental principles of his philosophy. The ultimate unintelligibility of the Cartesian universe, held together by the will of the Creative Deity, indicated, therefore, the need for a different starting point if the understanding necessary for the attainment of the good life were to be achieved. Since it has been shown impossible

---

"We ought to submit to Divine authority rather than our own judgment, even though the light of reason may seem to support with utmost clearness something else."

Principles, I.
to arrive at the totality of knowledge by starting from individual ideas, the only alternative is to assume the totality of knowledge and work down to individual ideas.

The second criticism conduces to this same conclusion. The conception of the universe as two self-contained systems, thought and extension, was manifestly unintelligible, since rational understanding consists in knowledge of causes, and of the existence of two or more substances no such causal explanation could be given. There can, therefore, be only one substance, which must be identified with the universe as a whole. In other words, the conviction that there could be but one substance was also a logical fruit of Spinoza's Rationalist faith in the intelligibility of the universe. If the order of nature is such as may be represented within a single deductive system, then everything must have a reason or ground either in itself or in something else. But any part of the universe is dependent upon, and interconnected with, others. The substance which is causa sui must, therefore, be identified with the totality of things, which alone can be self-dependent. Moreover, being thus infinite, substance must be identified with God, also traditionally defined as possessing infinite attributes (including, notably, that of existence) in this way giving to the first "adequate idea", the starting point of all reasoning, the title so abhorrent to earnest theists of
the age, "Deus sive natura".

The dualism was, furthermore, no less objectionable on logical than upon metaphysical grounds. It created the equally irrational problem of justifying the method of clear and distinct ideas. Descartes suggested that it was possible to doubt a logical sequence of ideas; that this of itself could not be assumed to reflect the order of nature. The assurance of a benevolent God was required, a God upon whose Will even the eternal verities depended for their existence. For Spinoza, however, reason is its own guarantee and "Truth is its own standard" (Ethics IV, 43); no other is necessary or possible. It is logically impossible to extend the doubt to logically necessary propositions.

The rationality of the real does not admit of external proof. It is most economically accounted for by the supposition that reality is composed, not of two diverse substances, thought and extension, which must somehow inexplicably enter into the intimate relation of knower and known; but of a unique substance, which presents as essential correlatives these two aspects or attributes. On this theory, no problem of the correspondence of ideas and objects can arise, since the ideas which constitute God under the attribute of thought necessarily coincide with their objects; there can be no idea without something extended, and no extended thing of which there is no idea.
Spinoza's method of definition follows from, and can best be understood in the light of, these two criticisms of Descartes' logic. The first idea forming the starting point in the attainment of a body of knowledge must be one which is self-evidently true, (an "idea of reason" and not of the senses) and is so complete and all-inclusive that all knowledge may be seen to be grounded in it. This "adequate idea" is, in his own words,

"... an idea which, in so far as it is considered in itself, without reference to the object, has all the properties or internal signs of a true idea."  
(Ethics II. Defn. 4.)

Descartes' search for an initial criterion of truth was unnecessary, since all men recognise true ideas when they are presented to them.

"Thus, as the truth needs no sign... it follows that the true method does not consist in seeking for the signs of truth after the acquisition of the idea, but that the true method teaches us the order in which we should seek for truth itself, or the subjective essences of things, or ideas, for all these expressions are synonymous."

(Improvement of the Understanding. p. 13.)

Nevertheless, he remarks a little later that despite the self-evidence of the true idea, "to be certain that our starting point is a really true idea, we need a proof,"

(Ibid. p. 15). It is not sufficient to argue that a self-dependent substance must logically be identified with God: its actual existence must be proved. The starting point must be an existential proposition if reasoning is not to be
confined to a circle of definitions.

At first sight, this appears to re-introduce the very demand for a "justification" of method, the need for which in Descartes Spinoza had radically criticised. Ultimately, however, the "proofs" of the first idea reduce to the assertion of its self-evidence. The use of the word "proof" in this connection, however, suggests that he meant by it something other than the "linear inference" of Descartes, and that the arguments introduced at this point will, therefore, furnish an illustration of his "method of definition". For it would clearly be impossible to "prove" by means of linear deduction a first principle to be true, since this would be to show that it follows from some more ultimate axiom; that Spinoza did not appreciate this seems unlikely, and therefore criticisms of the failure of his "proofs" so-conceived, misplaced.

Spinoza's method is supposed to give fresh knowledge about nature; his primary emphasis, therefore, is that the basic principles upon which both subsequent knowledge and the nature of the method are alike founded, must be adequate to these tasks. This means that an "adequate" definition in which the initial principle is expressed must not be merely formal, but must refer to existence. This is why in the Improvement of the Understanding, for instance, he concentrates upon the function of definitions rather than
axioms, where the latter do not yield knowledge of particulars, of concrete reality. Having insisted upon this, however, Spinoza's defence of his definitions reduces to an appeal to acceptance by rational men; to the insistence that they are self-justifying. It is not enough for him to argue that his definitions establish a useful terminology for talking about nature and for pointing out certain important features within it (although his philosophy sometimes receives this interpretation as a useful "system of concepts"); this assumes that nature exists. Empirical guarantee of its existence is not, however, for Spinoza a sufficient criterion. Moreover, human knowledge of this existence is dependent, as indicated earlier, upon the supposition that "nature" and "mind" are correlated aspects of a single whole. Thus a self-justifying definition in which this total requirement is expressed must be made the starting point of rational thought; this Spinoza finds in the definition of the most perfect Being.

In the "proof" of the existence of the self-dependent substance, which is to be identified with God, we have, then, an example of Spinoza's method of definition, and of the difference between his meaning of "proof" and that of Descartes. Proposition XI (Part I) affirms that "God or substance, consisting of infinite attributes, each one of which expresses eternal and infinite essence, necessarily exists."
To deny this, he says, would mean that His essence does not involve existence, which is absurd. The first "proof", in effect, says that either nothing exists (i.e. there is no substance) or God exists. Now it may be argued that this "proof" does not leave Spinoza's definition to rely simply upon self-evidence for its acceptance, since it starts from an existential proposition as its first premise—that something exists. As such, it is not so much a form of the Ontological argument as a regressive argument from Being (existence) to the ultimate ground of Being. Yet, even this reduces to a form of "self-evidence", in as much as it rests upon the fact that Reality as a whole is seen to be God. And this seems to be so even if emphasis is laid upon empirical finite existents, modes, as the starting point. For to rest much weight on the latter alone begs the question; modes disclose the necessary existence of God just because they are "modes"—but to be known as a "mode" depends upon the prior knowledge of God, the all-sustaining Being at the basis of everything which exists. Thus, despite the form of this argument from "something existing", it still seems true to interpret Spinoza as appealing ultimately to the self-evidence of his definition, of God's Being manifest in the totality of empirical existence. (Cf. the quotation from Alexander, cited on p. 238.)

The second and third proofs are variations upon the
first, depending similarly upon the assumption of the
rationality of things (that a reason, i.e. cause in his
sense can be given for the existence or non-existence of
anything) and that there is a world of real existence.
Their manner of presentation, however, shows that all de-
pends upon the dynamic, all-inclusive character of the idea
of God, and not upon a deductive proof in the strict sense
from a quasi-mathematical axiom or principle. That is, it
seems not so much a case of proving God's existence as of
exhibiting the reasonableness of a system of knowledge based
upon this in contrast with the inacceptability of one which
is not.

In this respect, Spinoza's "method" is, as it were, a
function of his monism. God's existence is not proved by
establishing the existence of an external reality corres-
ponding to the idea of Him. He is shown to be "self-reveal-
ed" (the adequate idea bearing its own mark of truth) to
those who carefully examine the implications of their ideas,
and the order in which they must be systematised. Spinoza
is, in effect, contending that God must be evident to all
who carry their thinking to its logical conclusion, to all
who do not stop short at a limited understanding of mere
"parts" of nature, but make some attempt to see things co-
herently in their relation to one another and the total
scheme of things. To do this is to see how things are
grounded upon God, and that he is the most completely real being. The claim to give a "proof" merely by means of a definition, when seen in this light is not so "dogmatic" and unreasonable as some criticisms have suggested. * As Alexander succinctly expresses it,

"Spinoza's conception of God is none the worse for being presented in the form of a definition. The great fundamental notions of Philosophers are not proved, their truth is seen. Proofs are nothing but machinery which help others to secure the philosopher's vision . . . Spinoza looked out upon the universe and declared it to be God: he saw it as a unity and found God there."

(From Philosophical ** and Literary Pieces.)

The changed conception of method is equally clearly seen in the subsequent development of knowledge from the initial idea. Abstract expositions tend inevitably to lend rigidity to any philosophy: this is particularly so in the case of Spinoza, whose philosophy has often been misunderstood by reading back into its content the "geometrical method" he is supposed to have employed. Although his exposition is in the form of a geometrical sequence of definitions and axioms, the subsequent propositions are not derived by a unilateral sequence of inference from the first adequate idea. More complete knowledge is reached by contemplating the true idea so that it gradually becomes

** Cf. also footnote to page 221.
more luminous; its ramifications in all spheres more evident. It is, moreover, important to bear in mind that Spinoza's whole conception of ideas is fundamentally dynamic. That is, ideas are not static, but of such a nature as to generate of themselves further knowledge. To have a true idea is, for Spinoza, to have a drive towards further true ideas. Thus the true idea of God will be given in a dynamic definition and tend to generate further ideas. Accordingly, the completed body of his philosophy is constituted not by a deductive series of propositions deduced from basic axioms, but in a system of mutually supporting definitions.

The precise meaning of "method" to Spinoza now becomes clearer. To seek truth is not, it has been seen, to seek new knowledge by means of a criterion, nor a conclusion of a different type from the premises, but to seek to know better something already known. This means arranging ideas in the correct order.

"Whence we may gather that method is nothing else than reflective knowledge, or the idea of an idea; and as there can be no idea of an idea — unless an idea exists previously — there can be no method without a pre-existent idea. Therefore that will be a good method which shows us how the mind should be directed, according to the standard of the given true idea."

(Improvement of the Understanding. p. 13.)

This means, in short, that the good method will enable us so to arrange our ideas that they are seen sub specie aeternitatis, in their true arrangement and derivation from
God. The possibility of doing this, of this methodology, needs further justification if his initial metaphysical assumption (upon which the whole Philosophy depends) be accepted — namely, that nature is itself a system of the same order as that which constitutes all true knowledge.

"An idea is the same 'objectively' as its ideatum is 'really'. If, then, there should be something in Nature which has no connexion with others, its objective essence (which must agree completely with its formal essence) would also have no connexion with other ideas, i.e. we could conclude nothing about it. On the other hand, those things which have connexions with others (as is the case with everything which exists in Nature) would be understood, and their objective essences would also have the same connexions: i.e. other ideas would be deduced from them, which again would have connexions with others, and so the tools for proceeding further would increase."

(Improvement of the Understanding.)

The second order ideas of method, then, are related to the first order ideas in the same way as the latter are related to extended things. Consequently since, as this analogy makes clear, for every idea there necessarily exists a second order idea, it follows that in having a second order idea we always have both a method for extending our knowledge and an assurance that the knowledge is of the same order, or type, as that from which it started. Upon this homogeneity of "idea" with "reality", of first and second order ideas, and of original with derivative knowledge, rests the complete confidence with which Spinoza asserted the necessary truth of the propositions within his system. They require demonstration neither by their deduction from
simple self-evident premises, nor correspondence with external reality. To show their order within a system affords sufficient guarantee of their truth, since by definition, there can only be one completely coherent system. The suggestion that there may be two or more such systems competing for acceptance by the rational man is self-contradictory. The completely logically coherent system of ideas witnesses to its own truth, and to its necessary reflection of reality; the complete sequence of definitions and propositions is necessarily the true one.

Hobbes, it was earlier remarked, no less than Spinoza, appreciated the homogeneity of subject-matter, and of premises and conclusions strictly demanded by the mathematical analogue. He too criticises Descartes' abortive attempt to proceed from idea to existence, to build up a totality of knowledge from his particular starting point; but for different reasons. Consequently, the alternative "technique" of reasoning differs markedly from that of Spinoza. Despite his monism, Spinoza in fact restated the duality of attributes, thought and extension, overcoming the dualistic difficulties of his predecessors by making minds correlative with matter, ideas with reality, whilst nevertheless retaining the distinction, albeit as between qualities of a single substance. Hobbes, on the other hand, achieves the required "homogeneity" by asserting the primacy of matter; he
denies the validity of the "idea", and the existence of "mind" as distinct from material existence.

The intelligible explanation, as for Spinoza, is in terms of causes. Hobbes' usage of "cause" is, however, perhaps closer to that of the physical sciences of the time than was Spinoza's, * intimating a "transcendent" causality relating one particular body to another external to it. Thus, for him, a truly intelligible universe is one in which everything is reduced to matter and motion. Thinking, like all activity, is motion, and since motion can only be predicted of bodies, mental processes are no less corporeal movements of an organism than are its more obviously biological and physical movements. "Mind" is but a name given to the sum of such movements within a single individual; the term "idea" being applied to the images formed by the "mind", - again, necessarily corporeal and of particular things.

From this alternative metaphysical point of view, Hobbes appears to make a threefold improvement (in respect of consistency) upon the professed Rationalism of Descartes: that of attaining greater "objectivity" of knowledge, of adhering to a real unity of method - to reduce everything to

* It must be noted, however, that there is a similarity between the two philosophers in respect of their special logical usage of "cause" - cf. footnote on page 31, re the theory of definition being developed in the 17th century.
matter and motion makes possible universal description in mathematical terms; and of starting from the one truly indubitable certainty - sense-given perceptions.

Whereas Descartes started from a subjective point of view, endeavouring to understand nature in its relation to mind, Hobbes is concerned not with intelligibility from the side of thought, from the point of view of the solipsist "thinking ego", but from physical reality as given; that is, he is primarily interested in giving an orderly interpretation of the world in terms of the phenomenal principles required by all true objects of science - the laws of motion. This he can do on the supposition that the universe consists simply of bodies. This in turn facilitated the second advance, that of providing a truly universal method. All phenomena, including moral and civil phenomena deriving from the "mental" nature of man, can be reduced to matter in motion, and so be explained by the one method, in terms of one set of universal principles. Lastly, convinced that all knowledge has its beginning in sense, the only certainty we have - upon which, he agrees, knowledge must be built - is the fact of our having sensations: the starting point of all reasoning must therefore be an empirical concept.

Thus arise the three characteristics which determine Hobbes' conception of the true method of attaining philosophic knowledge: the conviction that the world is composed
of bodies; that their orderly connection can everywhere be explained in terms of the laws of motion; and that all knowledge, even the most general must be built upon empirical concepts, and must at every point be generated by sense experience. They lead him to open his discussion of method within philosophy, upon the need for which he is no less insistent than Descartes and Spinoza, with the consideration of the true nature, subject-matter and purpose of philosophy (which follows from the convictions enumerated above).

Philosophy is defined as "knowledge of effects acquired by true ratiocination from knowledge of their causes or generation; or alternatively, of causes derived from knowledge of the effects".* That is, whilst the first requirement of philosophy is that it should be deductive, not all deductive knowledge is philosophy, but only that which concerns causes and effects. It is thus opposed to the knowledge afforded by sense and memory on the one hand, and theology on the other. For in contrast to the former, it seeks to know particular events not simply in their immediate appearance, but through their ultimate causes; and as "causal knowledge", it is confined to things which have a "genesis", being by definition precluded from understanding

---

* De Corpore. Chapter I. Like all definitions this is, he says, arbitrary, but one he finds useful to adopt. It is of no consequence to him whether it be accepted by others.
the concepts of "eternity", "infinity", and the like, with which Theology deals. Such questions, for Hobbes, fall within the bounds of faith and obedience, not reason. The nature of the intellectual process involved in obtaining this knowledge likewise confirms this conclusion. For, amplifying the notion of "Ratiocination" (alternatively called "computation") which appears in his definition, he adds that it comprises two operations of the mind: addition and subtraction. By their means alone widely differing bodies of knowledge may be constructed. Mathematicians, logicians, political writers and lawyers alike are employed in forms of addition and subtraction: the first calculate with numbers, the second with sequences of words: political writers with pacts or agreements to discover men's duties, and lawyers with laws and facts to ascertain right and wrong within private actions: even in everyday life we add or subtract as we see objects approach or recede. "In sum," he concludes, "in what matter soever there is place for addition and subtraction, there also is place for reason; and where these have no place, there reason has nothing to do at all." * Reasoning so described is devoted to elucidating mechanism; it is but "the natural reason of man, busily flying up and down among the creatures, and bringing

* Leviathan, p. 25.
back a true report of their order, causes and effects. Consequently, the end of philosophic knowledge (whether of "natural" or civil body) is power; its usefulness lies in the avoidance of such "calamities" as civil strife; its subject matter is "every body of which we can conceive any generation... or which is capable of composition or resolution." **

The method by which philosophical knowledge is attained accordingly has two aspects: analysis and synthesis. By analysis reason proceeds from effects to discover the ultimate causes of things, the first principles of the subsequent synthesis, which, in its turn, moves from causes to effects, exhibiting in a deductive form the whole content of knowledge as it is based upon the ultimate principles.

All knowledge starts from sense experience, but it is analysis of the empirically given which alone yields the fundamental conceptions from which subsequent inferences are to be drawn. This part of the method has two stages: first, the resolution of sensible objects into their "parts" to disclose the "universal concepts" in terms of which the account of phenomena as they appear in experience must be given: the concepts so discovered must then be defined.

This double process yields the definitions upon which the synthesis can subsequently proceed. The collection of fundamental definitions itself — of which the most general are Motion, Body and Space — constitutes First Philosophy.

In this account (as given in the De Corpore) Hobbes emphasised the arbitrary element in the definitions of the first principles, so keeping his epistemology closely analogous with mathematics, and affording grounds for insisting that all scientific (or philosophic) knowledge is both deductive and "general". For the premises of deduction cannot themselves be deduced, but must be constructed by men who, in this sense, are the "creators" of truth. The construction of the premises of philosophical deductions, then, is achieved by the arbitrary imposition of names upon the "ultimates" disclosed by the preliminary analysis. His doctrine of language provides the salient point at which he can proceed from sense experience, the certain starting point of all knowledge, to the general knowledge which is philosophy or science. For the primary significance of names is that they can be connected into propositions in such a way as to afford the general knowledge of things required by science, by enabling men to view abstractly attributes they possess in common. At the same time, to make speech — that "most noble and profitable invention of all
others" - the mediating link between the two orders of knowledge, has the additional advantage of enabling Hobbes to claim that the new knowledge is transformed from the sense experience in which it originated by no less sensible means. That is to say, the use of words, of "names" given to the after-images of sensations, explains the constitution of philosophic knowledge without departing from the homogeneity of premise and conclusion. For, if general concepts can be accounted for in this way in terms of sensible experience, then due reconciliation of starting point and resultant philosophic knowledge is achieved without resorting to nonsensible explanation. And his doctrine of language, he claims, does constitute a means of doing this, because it enables him to recognise the human power of introspection supplying the conscious knowledge of sensations required for rational knowledge, without introducing a new, peculiarly human, "faculty" or function of rational insight. Words of themselves are capable of this double rôle - of making introspection possible, and at the same time connecting it with sense experience - since on the one hand they provide the means whereby man can communicate his thoughts to himself, whilst on the other, they can be traced to the universal physical power of making sounds.

If, however, language serves thus to register our thoughts and so to fix what is of itself fleeting and give
rise to true philosophic knowledge, the knowledge so attained warrants on the part of man no assumption of arrogance towards the rest of creation. For the propositions of philosophy, although passing beyond sense experience, are not asserted about the real world, what corresponds to these general names in the latter being simply an aggregate of individual things.* Reasoning can never pass beyond the sphere of names, and the question of truth in philosophy pertains only to propositions, to names. The truth of a proposition is ascertained not by its "correspondence" with experiential data, but by exhaustive resolution of the names conjoined within it to their simplest elements; or if further proof be necessary, by correlation with the primary definitions laid down by philosophy as constitutive of the foundation of all human knowledge.

The example of "analysis" given by Hobbes is taken, as might be expected, from mathematics. The idea of a particular thing such as a square, he says, must be analysed into a plane bounded by a certain number of straight lines and right angles of equal size. This resolution, he sug-

* "Of names, some are proper and singular to one only thing, as Peter, John, this man, this tree; and some are common to many things, man, horse, tree; every of which though but one name is nevertheless the name of divers particular things; in respect of all which together, it is called a universal; there being nothing in the world universal but names; for the things named are every one of them individual and singular.

Leviathan. p. 19
gests, yields the features common to all matter - line, plane, limitation, angle, equal size, etc.. To find the causes of these "universals" (as he calls them) will thus enable us to combine them all to form the cause of the square. "Thus I conclude, therefore, that the method of attaining to the universal knowledge of things is purely analytical."

**Prima facie,** the analysis seems to depart from the purely mathematical analogue with the introduction of the concept of "cause". When by analysis the "universal" is reached, one must go on to seek its "causes" (meaning by this not "logical ground", but temporally precedent, "efficient" cause). But this seemingly unintelligible confusion of the categories of empirical science with purely formal considerations becomes comprehensible in the light of his statement concerning the nature of this universal cause.

"But the causes of universal things (of those at least that have any cause) are manifest of themselves . . .; so that they need no method at all, for they have all but one universal cause, which is motion. For the variety of all figures arises out of the variety of those motions by which they are made . . . ."

Kinetic principles of explanation are thus extended from the empirical sphere of "real phenomena" to the province of formality. Everything is to be understood as caused by motion; only here does one meet the limiting notion, since
"motion cannot be understood to have any other cause besides motion".

Once the first principles of knowledge are reached, the next stage is synthesis, the deduction of phenomena from these premises. The difficulties involved in the carrying out of this stage of the method, deriving from the characteristic features of the doctrines discussed in the preceding paragraphs, will be considered in the following chapter, relating them to the task of showing those respects in which Hobbes most significantly revealed the limitations of even his interpretation of mathematical method.

Meantime, to summarise the points so far considered, it may be said that Hobbes' Rationalism appears to manifest itself in three ways in regard to philosophic knowledge: in the means of its attainment - by reasoning, an arithmetically conceived activity of adding and subtracting; in the geometrical form in which the whole body of knowledge is to be set out, progressively derived from the ultimate principles disclosed by analysis; and in the generality of its concepts, the universal terms in which the philosophic scheme is presented. It is in this sense that, despite his fundamental empiricism, Hobbes' aim everywhere is to "rationalise", opposing reasoning to experience, and wisdom against the knowledge yielded by mere sense experience, "prudence", no less than against the dictates of uncritically accepted
custom in civil life. At the same time, it is clear that Hobbes is not a Rationalist in the manner of Spinoza, any more than in that of Descartes. The question of the "rationality of the real" is one to which he is indifferent. Philosophy, on the other hand, is not directly concerned with reality, but with names; whilst on the other, the "connectedness" or otherwise of the data of sense experience through which we do have contact with reality, is unimportant.

Reason is not, for Hobbes, a Divine illumination of man's mind, at once distinguishing him from the beasts, and uniting him with God; it is reasoning. Its analogy with mathematical reasoning is, consequently, very different from that of either Descartes or Spinoza, being predominantly of the pattern of arithmetical calculation rather than of intellectual insight. In consequence, even the chief feature which he and Spinoza had in common—the retention of the conception of the homogeneity of the universe—was manifest in very different ways, and thus showed in different (and complementary) forms some of the inherent difficulties of the mathematical pattern of thought.

* I.e. this doctrine is the intention at least of his logic (as given in the De Corpore) — the extent to which it was consistently maintained will be debated in Chapter X.
CHAPTER X

BEYOND MATHEMATICAL ANALOGIES.

The chief significance of the anti-dualist reaction* of Spinoza and Hobbes to the method of Descartes, it was suggested, lay in the attempt to adhere more closely to the "homogeneity" of premises and conclusion, and of subject matter, required by a pattern of Reason and intelligibility modelled consistently upon that of mathematics. On the basis of this, it was seen, diverse interpretations of the nature of mathematical method as employed within philosophy itself were put forward, each of which revealed and corrected certain inadequacies inherent in the Cartesian method. At the same time, in the philosophies of Spinoza and Hobbes were also manifest features going beyond the strictly conceived mathematical analogies; the gap between ideas and factual reality was, in effect, bridged by them, no less than by Descartes, at the cost of invoking extra-mathematical reasoning and assumptions. This Section will

---

* It is not being suggested, however, that the philosophies of Hobbes and Spinoza are wholly determined by their criticisms of Descartes. This connection is emphasised for the purposes of this thesis, whilst it is nevertheless recognised that the form of their philosophies is largely sui generis.
therefore conclude with a consideration of some respects in which they too, within their own systems, thus indicated the inevitable limitation of mathematical categories and methods for giving an exhaustive interpretation of reality; the nature and limits of the "abstraction" upon which 17th century rationalism was based.

In the case of Spinoza, this centres around the doctrine of Scientia Intuitiva, and associated concepts; the conception of a "third way of knowing" lying beyond that of Imaginatio and Ratio and upon which even the limited validity of lesser knowledge ultimately depends. It is only in virtue of the special insight which is Scientia Intuitiva that he can solve the problem of the relation of whole to parts by which he has replaced the earlier dualism. In putting forward his alternative starting point, Spinoza not only restated the existence of the duality (albeit as attributes of the one substance) but replaced the original Cartesian problem by one at least as difficult - namely, that of reconciling the existence of the "parts" with the relatively undifferentiated "whole" with which his method of definition commences. Having rightly shown that a monistic system is the consistent mathematical theory, some other way must be found to account for the finite individualities, the differences between the intellectual and the purely "passionate" life, with which the specifically ethical part of
his philosophy - the main impetus to his writing - is concerned.

This basic problem - one which led Leibniz to erect his system upon a diametrically opposite metaphysical point of view in the Monadology - underlines the further incoherencies of his deduction of the concrete attributes of God or Substance forming the first idea. The source of the difficulty is that Spinoza’s initial premise, his definition of substance, does not appear to contain the features demanded by the conclusion, by the propositions concerning the nature of the finite modes. There is, as Taylor * objected, no "principle of individuation" such as will account for the "finite modes Peter and Paul", which are presumed throughout the ethical discussions at least to be "genuine historical individuals with 'biographies' ...".

In reply to this, it may be alleged ** that this is in effect a pseudo-problem, created by a misunderstanding of Spinoza’s words. The distinction between "high abstractions" such as universals, and individual agents is, one may insist, one which Spinoza himself would have accepted, and to the disadvantage of abstract universals and the form of knowledge which employs them. But to adopt this line of defence depends upon stressing the logical priority of

** E.g. by Hallett, Mind. 1942. "Some Recent Criticisms of Spinoza."
the intuitive insight into the complete nature of reality, the all-important place of Scientia Intuitiva within the philosophy of Spinoza. The puzzle concerning historicity of finite modes does indeed disappear when the latter is appreciated for what it is, not a positive addition to timelessness, but "a relative degradation of eternal creative agency". * Likewise, the finite mode is not irreconcilable with the universal substance if it be remembered that the more precise rendering of Spinoza's concept should not be Deus sive Natura, but Deus sive Natura Naturans. Thus finite modes are contained within the premising definition as an essential potentiality.

The insistence that this dissolution of the original difficulty depends upon the primacy given to Scientia Intuitiva is not here intended to show that Spinoza failed to be consistent to the ultimacy of mathematical principles, and so failed to adhere to a truly mathematic mechanism. ** For such, I believe, was never Spinoza's aim. It does, however, exhibit within his philosophy the inadequacy of a mathematical pattern of Reason to give an exhaustive account of reality. And in so far as his method of definition was based upon one interpretation of the mathematical analogy, it shows the non-mathematical assumptions required for its

* Ibid.
** This is one of Taylor's criticisms.
This method alone does not serve to supplement and correct the Cartesian error; for without the introduction of a supra-mathematical insight, Spinoza's own reasoning would remain within the circle of abstract definitions, and no contact with concrete reality be made. Such a contact, it has been seen, essentially demands the ability to pass from whole to part. This passage is justified only on the presupposition that the ordering of whole to parts, and the necessary generation of the latter from the initial substance, is perceivable sub specie aeternitatis. It is this primary assumption which enables Spinoza to point so clearly to the insufficiency of reasoning conducted along strictly unilateral sequences of inference, and to insist upon the "virtuous" circularity involved in most epistemological discussion, but which is indefensible on a strictly geometrical analogue for Reason.

The contention that Scientia Intuitiva - a doctrine which at once removes certain otherwise incomprehensible assertions, and takes him beyond mathematical analogies - is of central importance to Spinoza's philosophy may be supported by a closer examination of his deductions in the earlier Books of the Ethics. Here the existence of finite modes, seemingly inexplicable without the insight of Scientia Intuitiva, is accompanied by a further questionable deduction - namely, of the specific attributes of God. Does
the definition of God in fact account for everything that is taken to follow from it?

Even admitting that, as pointed out, the inference is not merely linear, but that the series of definitions and axioms are "mutually supporting", it seems clear that nothing but the widest generalities can be derived from these definitions alone. In Book I, for instance, it is shown from the first eight definitions that God exists, is a free cause, an immanent cause, eternal, immutable, and determines all things. But none of these deductions discloses any concrete fact about God, about the things "contained" in him. How, then, can Spinoza disclose the nature of the "attributes" of God, the existence of which he has said (E.I, 10. Sch.) is self-evident? In fact we find them simply stated in the form of axioms. From the axioms that mind and body exist (E.II, Ax. 2 and 4) he argues to the existence of attributes of thought and extension (no satisfactory reason being given why just these two are known to us) of which particular thoughts and bodies are modes. In this way, the attributes are clearly not accounted for by the definitions alone - their only "justification" would therefore be an appeal to experience (which Spinoza would reject) or to the ultimate insight of Scientia Intuitiva.

Spinoza's reply to Tschirnhaus' criticism of his attempted deduction of the modes of these attributes would seem to
confirm his departure from mathematical reasoning. Tschirnhaus had objected that such a deduction assumes that it is possible to deduce several properties from a single definition; but this assumption, with the aid of mathematical examples, he questions. Admitting the truth of this in the case of the mathematical figures, however, Spinoza insists that in the case of the "real things" which form the subject-matter of the Ethics, this objection does not apply. Here he seems therefore to draw explicit distinction between "real things" and "mathematical concepts" which suggests that he found important differences between the development of his deductive system and the construction of a mathematical system. And in other places (e.g. Epistle 83) he emphasises that things do not follow from God in the same way as mathematical theorems from the definitions and axioms.

Those who minimise the significance of the third way of knowledge for Spinoza's epistemology will, of course, interpret this "failure" of deduction differently. It will be said that he has mistakenly tried to exhibit what Kant was to call synthetic a priori truths in a form suitable only to analytic propositions, and for this reason could not derive all things from the original definition of God. But, we have insisted, Spinoza himself emphasised that the dependence upon God was not of a strictly logical
order, that the "metaphysical necessity" relating finite modes to the whole was not that of a creature in a "mechanistic universe" within which it was set. The important part played by Scientia Intuitiva in the strictly ethical parts of his philosophy - the "utility value" of the third way of knowledge in finding the true "path of life" which was his ultimate aim - seems inexplicable if this form of knowledge is considered to have little or no important bearing upon his epistemology.

On the interpretation here adopted, Scientia Intuitiva does not simply represent a more detailed pursuit of the deductions required by science, and less adequately performed at the level of Ratio itself, but a supra-mathematical insight by means of which Spinoza's reasoning claims to pass beyond the circle of abstract definitions, to make contact with the concrete reality with which his moral philosophy is concerned. Without this, as the earlier part of the Ethica shows, his deductions were indeed confined to the "utmost generalities", and the existence of attributes and finite modes remain inexplicable "assertions". With it, on the other hand, Spinoza can lay claim to overcoming some of

* I am here adopting what may be referred to as the older orthodox interpretation (e.g. Joachim) of Spinoza in respect of the difference between Ratio and Scientia Intuitiva, although aware that it may be defensibly argued that Ratio also can give concrete knowledge, and that the distinction here drawn between Scientia Intuitiva and Ratio is too sharp.
Descartes' dualistic difficulties, but only by at the same time exhibiting the insufficiency of purely mathematical forms of reasoning.

To the doctrine of Scientia Intuitiva are linked other similarly important features indicating the insufficiency of mathematical categories of intelligibility. The first which obviously arises from this supra-mathematical "way of knowing" has already been touched upon: namely, the highest object of knowledge is not an abstract universal as are the objects of mathematical knowledge. If it be agreed that the doctrines of the more specifically ethical parts of his work do bear significantly upon the epistemological, it may be suggested that the "Eternity" apprehended by Scientia Intuitiva is not the bare logical necessity which some of his statements in the earlier parts of the Ethics verbally suggest (e.g. E. II, 44, Corollary ii.). The special mode of understanding beyond Ratio which is alone appropriate to its understanding indicates that the essence of Eternity lies not in the necessary connexions and relations of things, but can only be perceived when these are woven into concrete individuals. For Spinoza, reality and eternity are rather the same as completeness and individuality. Eternity is existence par excellence: it thus corrects the opposite emphasis upon abstract universals common in mathematically
inclined era of speculation.

The criticism of current abstractions which this affords is neglected by those who relegate the doctrine of Eternity from the central place it manifestly has in his system to an extraneous "mysticism" or religious bias superfluous to his philosophy. Thus, Broad, for example (Five Types of Ethical Theory, Chapter I.) can presume adequately to propound and criticize Spinoza's Ethics after making the confession that "I shall ignore everything in his system which depends upon what he calls Scientia Intuitiva, or the third kind of knowledge; i.e. I shall ignore his doctrines of the intellectual love of God, of human Blessedness, and of the Eternity of the human mind".* This is as if he were to set out to tell the story of Shakespeare's Hamlet, having decided to simplify matters by ignoring Hamlet, the Queen, and Ophelia. His doctrine of Eternity is not only, in Hallett's words "the crown of his practical philosophy" but also "the key to the theoretical". It is a species of existence beyond time and duration (the mathematically

* He adds, "These doctrines, I am convinced, are the philosophic expression of certain religious and mystical experiences which Spinoza and many others have enjoyed, and which seem supremely important to those who have had them. As such they belong to Spinoza's philosophy of religion rather than to his Ethics in the ordinary sense." By "Ethics in the ordinary sense", he seems to mean in his, Broad's sense, for clearly the state of human blessedness described in Spinoza's Ethics is the climax of his teaching towards which all else is heading.
measureable) without knowledge of which we cannot have knowledge of any kind, even imaginary of a changing world of finite modes.

Secondly, the doctrine of Eternity introduces a deviation from the concept of the essential homogeneity of man and the universe. Despite earlier statements to the contrary, Spinoza is at this point committed to the view that man is unique in virtue of this capacity for knowledge. The guarantee that man can know the eternal, the true objects of knowledge, is that he, though finite, is yet himself in some sense eternal. Here the conviction that "Sentimos experimurque nos aeternos esse" takes the same importance in his system as the establishment of the existence of the self in the philosophy of Descartes. According to Alexander, it is a saying which has never been completely understood. Nevertheless, this much seems clear: the extension of eternity to human minds which occurs only in his later thought imposed a strain upon his original definitions of which he must have been aware, and moves against his otherwise consistent assertion of man's homogeneous status with the rest of the universe.

---

* Spinoza's point that even knowledge at the level of imagination is possible only in so far as its objects have begun to approximate to eternal being bears close similarity to that of Plato concerning the "shadows on the wall" of the Cave. Even this lowest stage of knowledge, for Plato, would be inconceivable without the existence of the real objects which are known to the higher stage.

** Philosophical and Literary Pieces.
In one sense, of course, the attribution of eternity gives no unique status to man. Tautologically, eternity is a universal characteristic of all modes, just because they reflect the nature of substance; but some remarks indicate that eternity pertains to the individual human mind in a degree different from that belonging to the whole. Although, negatively, he makes it clear (e.g. E.I, Defn. 7, and V, xxiii, Sch.) that he does not mean immortality as popularly conceived—particularly by the "spatialisation" of mathematical thought of which Bergson complained so bitterly—as endless quasi-temporal persistence, more positively, he adds that it is not the whole mind which is eternal.

"For the part . . . which is eternal is the intellect, through which alone we are said to act; but that part which perishes . . . is the imagination itself."

(Ethics. V, 40. Corollary.)

Again, this would not in itself be a sufficient reason for claiming in some sense a unique status for man, since everything for Spinoza has intellect. But when we enquire what is special about intellect in virtue of which it is eternal, it is noteworthy that Spinoza is introducing the very characteristics traditionally taken to distinguish man from the rest of the universe. For the essential distinction between the intellect and imagination, in virtue of which eternity is predicated of the former, is its power of ordering the effects in some way. That is, the "eternal" part of man's mind is so designated on account of its ability to "internalise".
as it were, its experiences, and remain undissolved by
ticissitude. But this is precisely to reaffirm one of the
significant factors concerning man commonly regarded as dis-
tinguishing him from the rest of creation which "suffers"
and reacts to external experiences, and does not truly "act".
And, indeed, Spinoza himself says this is at once the charac-
teristic of the "eternal" part of man's distinguishing it
from the "perishing" (which is fragmentary and disordered)
and the perfection man shares with God, and in virtue of
which his finite understanding is at least able to apprehend
the eternity of God. Whilst, then, man may have the same
logical name as the rest of the universe - "finite mode" -
he is in fact somehow unique, possessing eternity in a dis-
tinctive sense which contrasts with the mode of existence
generally attributed to finite and contingent beings, name-
ly "duration". In Reason or intellect (broadly conceived)
Spinoza finds an aspect of man which can be adequately de-
scribed not in mathematical categories, but only in terms
applicable to God, or the "whole" of which man is then a
peculiarly significant "part" or "mode".

The third insight into the limitations of mathematical
Reason indicated by the "third way of knowing" lies in its
rejection of the "anthropocentrism" of the former. This
statement appears, on the face of it, somewhat paradoxical,
since one of the significant features of the adoption of
mathematical forms of reasoning was precisely the dismissal of categories of final causes exhibited within Medieval anthropocentrism. It is, however, necessary to distinguish between two senses of the word: first, that which places man in a special place at the centre of the universe, deriving the main categories of interpretation from his own experience in acting. Second, the form of knowledge which concentrates upon those characteristics which have "utility value", those "causal" characteristics which enable us to manipulate data and produce a desired result.

The rejection of the first, Spinoza shares with most thinkers of his time. The second is less obvious: it is a criticism of forms of knowledge which, like 17th century science, concentrates upon efficient causality and so abstracts from the intrinsic individual nature of things, and a denial of the identification of knowledge with power (explicitly maintained by Hobbes, for example) which mathematically-mechanical categories of intelligibility ultimately imply. In this sense, it is a valuable criticism of the mathematical "abstraction" of thought which describes things in their external relations and concentrates upon the abstract (causal) characteristics of objects. Mathematical thought tends to an exclusive concern with the contribution made by things to certain ends external to them (their "cash-value" as it were) rather than their intrinsic value. As such, its categories
give a highly abstract view of the situation described. This abstract view is precisely one which Scientia Intuitiva surmounts when it sees things in their concrete individuality, as grounded in God. The "limits of purpose", Spinoza would agree with Stocks, and of associated categories, is that "it accounts for none of the highest human activities . . . the very existence of morality of religion, of genuine thought and knowledge depends upon the ability of man to rise above the level of purposes,* upon the ability to rise to the level of Scientia Intuitiva and Blessedness.

Fourthly, Spinoza sees the limitations of an "analytic" approach to the understanding of things. This criticism

* Stocks. The Limits of Purpose. His words, complaining against the abstract purposive view of things, seem to express so nearly Spinoza's own meaning, that they merit a lengthier quotation. " . . . Purpose is a dominant interest in a result or type of result. Clearly, any feature of a situation has infinite ramifications and is capable of entering into an infinity of practical combinations; and clearly any change in a situation will have consequences inexhaustible in range and variety. Purpose assesses the situation and deals with it from a definite angle. The value of each feature is its actual or possible contribution to a single result, and this is also the sole test of the acceptability of any change proposed. Thus, what is taken into account is viewed partially and abstractly, and much is forced out of sight altogether by the limitation of the point of view. This may be stated otherwise by saying that the thinking characteristic of the attitude of purpose is at the level of the class concept, and the abstract universal. To such thinking the individual always presents itself as an inexhaustible complex, an unknown or unknowable. By abstraction it simplifies the problem, but at the cost of a divorce between knowledge and reality; "The individual may exist," it says, "but it is the universal that is known." In a word, for such thinking, and for the purpose which is its practical embodiment, there is no individual."
is exemplified significantly in his insistence upon the integrated complexity of the whole man, and, particularly, in his sustained polemic against Descartes' separation of will and intellect. The conception of mind as made up of separate "faculties" was the fruit of Cartesian method, and is the attitude taken by men who have not passed beyond the first stage of understanding. When beyond this, however, it is realised that "will" and "intellect" are not specific entities, but are abstractions - universal terms like "humanity" and very misleading. "Will" so-called is the whole of man considered as an active being - this "appetitus" in man being what "conatus" is universally, a striving to persist in one's essence. The element in judgement which Descartes had attributed to a super-added movement of "will" is but a function of the idea itself.**

* Spinoza's criticism of Descartes, of course, goes deeper than simply of "faculty psychology" - he is objecting to the whole conception of will, etc. as even distinct functions.

** It is interesting to note, however, that in one point of his reply to Blyenberg's queries about the problem of evil, Spinoza himself writes " . . . I say with Descartes, that if we could not extend our will beyond the limits of our very limited understanding, we should be most wretched. It would not be in our power to eat a piece of bread, or to move a step or to exist." (Ep. XXI.) These words are difficult to reconcile with his contentions regarding affirmation and negation contained in ideas themselves, unless they be interpreted as an admission that will is of greater extent than intellect if by the latter is meant only "clear and distinct" ideas, although not if all ideas be included, for then the range of our affirmations and denials is co-extensive with the range of ideas. This would in itself then indicate a criticism of the Rationalist narrowing of the concept of Reason and intellect.
For ideas are not dead images, not "dumb things like pictures on paper, but modes of thinking". (E.II, 45, Sch.) The affirmation and activity of judgement is that of the ideas, active essences with a spontaneity of their own.

For all its limitations, Spinoza's doctrine of ideas is, moreover, a salutary reminder to those who rest their faith on explanation in terms of ultimate elements of analysis, or the abstractions of a mathematical logic, that its judgements are not completely self-contained, but are only relatively substantial features isolated from a continuum of thought. Judgement is for him essentially a process, not a momentary and unitary intuition as in the Cartesian philosophy. Likewise, his doctrine is a protest against an "abstract" view of knowledge, to which a mathematical orientation may incline one.

This brings us, accordingly, to the final point to be made here, in respect of the way in which the later parts of the Ethics, concerning doctrines of Eternity and its appropriate mode of knowing, cast a light upon problems created by the metaphysics of Parts I and II, relating to the prima facie contradiction between his Determinism, and his moral "recommendations". Two important points here arise. First, it may perhaps be argued that the chief significance of this "illumination" lies in its elucidation of Spinoza's fundamental protest against the divorce of fact and value — of the insufficiency of categories of intelligibility which
exclude that of value — and thus of the mathematical abstraction which created it. Secondly, this "contradiction" can perhaps itself be seen to be based upon a misunderstanding of Spinoza's moral theory, in so far as it is not a prescriptive ethics, and thus, in turn, upon a neglect of significant features of his epistemology — features which reveal the fundamental nature of his divergence from current conceptions of knowledge, of "abstract" quasi-mathematical knowledge.

To begin with the first of these — a central "incoherence" in Spinoza's system frequently discovered by his critics, lies in the practical difficulty of how, on his metaphysical principles, the transition from servitude to freedom can occur. No less frequently, however, do they reveal a very fundamental misinterpretation of Spinoza, seeing him caught within the toils of the mathematical abstraction and the mechanistic conception of man and the universe which it engenders, rather than, at this point at least, its critic. Taylor, for instance, sees Spinoza's practical recommendations to be, in fact, "that we should use our cool hours in meditating on the inevitable necessity of the law of cause and effect . . ." * But Spinoza does not exhort men to achieve their freedom by contemplating

external causes by which they are determined, but by understanding the universal interconnection of events sub specie aeternitatis. Freedom is not simply the recognition of necessity, but the understanding of how it operates, which is to be gained by seeing all things "in God". Moreover, to the man who understands this, the necessity is not a mechanical necessity on the pattern of mathematical science.

"As to what you say, that I made men so dependent on God that I make them like the elements, plants and stones, this shows sufficiently that you most perversely misunderstand my opinion, and confuse things which concern the understanding, with imagination."

(Ep. XXI, p. 430.)

The problem, therefore, is misconceived, (equally a confusion of understanding with imagination) when described as that of how man's effective "will" may determine his actions in accordance with "reason", and with, or in opposition to, his impulses, appetites and desires, which are regarded as struggling or co-operating causes; this whole nomenclature has been dismissed by Spinoza as significant of entia imaginationis only. The practical difficulty does not lie here, since passions are not for him mechanical forces, nor the human mind a series of states in which reason must struggle against some mechanistic opposition if the ideal life is to be achieved.

The problem on Spinoza's principles, wherein there is no need to suppose the introduction of some extraneous
effort to make an idea effective, is rather that as to how a man can secure the more adequate ideas, with their greater effectiveness, which form the basis of his moral attainments. The practical difficulty – which Spinoza recognises to be very great – lies in the "negativity of the actual being" (to employ Hallett's phrase) of most men; it is self-reference which is the root of all irrational valuation, of the inability to overcome the external causation preventing the attainment of Blessedness, and thus of the imperfection of man's conduct. His moral improvement, accordingly, consists not in the growth of his power over mechanically compelling passions, but over himself as he appears in the self-referential perspective: his power to emend his intellect from the first to the third stage of knowledge. In this sense, the true causality is in fact that of reason – the causality of passion being but pseudo-causality appropriate to the understanding of "imagination". In other words, the knowledge required for conduct contains a union of fact and value; it is not of selected, measurable aspects of experience only, but is evaluative – it is of things in their correct qualitative ordering, or grading, sub specie aeternitatis. Only knowledge in this highest sense is effective upon conduct.

The all-importance of his doctrine of Eternity, the non-
mathematical aspect of his philosophy, thus receives its supreme exemplification in regard to what, after all, was Spinoza's primary concern - the discovery of a path of life. His statements concerning the inefficacy of Reason made in the context of earlier discussions of imagination may mislead; there he confines himself rather to speaking of "emotions" reserving speech of man's determination by Reason, the true freedom, for the stage of knowledge which perceives all things in God. Thus in Part V he does, in fact, maintain that the intellect has the power of "ordering" the effects, and claims for Scientia Intuitiva that it is "the power by which it is able, in so far as they are passions, if not actually to destroy them, at least to make them constitute the smallest part of the mind". It is only knowledge in terms of the earlier stages which is impotent to do so.

To turn now to the second point raised above, having considered the misunderstandings embedded in some criticisms of Spinoza even within the terms of the prima facie difficulty of reconciling his determinism with his moral "recommendations", we have to enquire how far this is perhaps itself a pseudo-problem, created by failure to appreciate the unique nature of Spinoza's epistemology, from which derive the chief characteristics of his Ethics.

Spinoza's novel conception of "ideas", fundamental to
the whole philosophy, results in the virtual identification of psychology and logic. That is to say, to have an idea is to be in a certain state; to have knowledge is to act accordingly. Spinoza's ethics is not prescriptive in the usual sense, since it is not put forward as a theory to which men can give or from which they can withhold assent. He is not, in fact, "recommending" a mode of conduct, but rather describing what is the life of the "free man". To understand is to act. As the more epistemological parts have made clear, everything in the world, being a mode of God, has potentiality for the life of Blessedness (and necessarily desires it); the absence of this life is entirely due to ignorance. Spinoza's determinism is, then, quite compatible with his ethics - it is incompatible only with an "abstract" view of knowledge, a view of knowledge which was quite alien to the Greeks but which obtains increasing prominence in centuries of marked scientific advance such as that in which Spinoza was writing. It is significant that Descartes, for instance, should record his intention to be a "spectator" of life's happenings (Discourse) in order to improve his understanding. Spinoza stands in sharp contrast to such an attitude, however, the distinction between theory and practice being for him non-existent. Thus in the general bearing of his whole epistemology, no less than in the particulars outlined above, Spinoza may be
regarded as effectively criticizing the sufficiency for man's life of "reason" and "knowledge" understood in an abstract, quasi-mathematical sense.

Hobbes did not so directly question the ultimate sufficiency of Reason as mathematically conceived; yet despite the seeming rigour of his adherence to just such a conception, it is not difficult to detect frequent points at which his reasoning takes him beyond, and completely out of accord with, mathematical analogies. For instance, reflection upon the seeming incompatibility between the ontological status of the principles disclosed by analysis, on the one hand, and the use to which they are to be put in the subsequent synthetic interpretation on the other, leads one to suspect the illicit introduction of non-mathematical assumptions at many points in the argument.

Briefly, the problem relating to his "consistency" first presents itself thus. Within Hobbes' system of philosophy the Laws of Motion * should, on the deductive pattern he

* He seems to suggest that the ultimacy of the Laws of Motion will be conceded by all unprejudiced thinkers. Hobbes' own conviction of the universal application of Galileo's discovery was provoked by the problem concerning the nature of sense perception. Reflection upon this question led him to the conclusion that without change of motion, all differences between things, and thus sense-perception, would disappear, and that therefore change of motion was the universal cause of things. This fundamental principle seems to have been primary in the order of his conception of philosophical method, the deductive method
has outlined for the second stage of method, be progressively revealed in the various branches of knowledge, - be shown to underlie the motions of bodies in mechanics, to govern the motions of particles in bodies in Physics, and the motions in men's "minds" with which the "mental sciences" are concerned. The Laws of Motion, in short, ought to explain completely the private and social aspects of all human behaviour. But if the first principles of this universal science are only definitions, the arbitrary conjuction of "names", how, we may ask, is this synthetic interpretation possible?

The increasing prominence given to deduction in the De Corpore led Hobbes to emphasise the purely arbitrary element in the first principles. In addition to thus retaining the analogy between the process of reasoning in philosophy and mathematics, the resultant deductions similarly depend, in both cases, upon the abstract and purely formal nature of the definitions from which they proceed. So far, Hobbes' emphasis seems to derive from interest in the fact that in mathematics it is possible to judge and draw conclusions, to reach new knowledge, on the basis of given concepts alone, without reference to experience.

of mathematics striking him as particularly suitable to the principle's application, to the exposition of the universality of kinetic causation.
Analogously, the "truth" or "falsity" of propositions into which the "names" or concepts are connected within philosophy, on his theory, depends upon a single criterion: whether the subject of a proposition be contained in the predicate.

Consistently maintained, this view leads to the conception of philosophy itself as but "the establishment by reasoning of true fictions". The analogy of mathematics, rigorously pursued, leads, as Hobbes thus shows, to ultimate scepticism concerning knowledge of reality. Whilst sense and memory give knowledge of fact, philosophy discloses the consequence of one affirmation to another (and in this sense is "conditional") the certainty of its definitions arising from their status as mere application of names chosen with a determinate meaning. But Hobbes cannot totally neglect the question of truth embodied in "real" or synthetic propositions, although this theory alone takes no account of it. For not only has he insisted that philosophical reasoning is concerned with the (efficient) causes of things, but also claimed that it is possible, by synthesis from the first principles discovered by analysis, to obtain an absolute science of the general aspects of things, and even some understanding of their more particular and complex relations, within the world of nature.

Where the "arbitrary" character of the definitions is insisted upon, then, this "synthetic" knowledge becomes
explicable only on the assumption of a strict parallelism, or isomorphism, between the order of linguistic deduction and the order of natural reality. This assumption Hobbes nowhere justifies; but it is explicitly indicated in the theory of "association of ideas" which makes its appearance in his psychology. The verbal associations by means of which men (in contrast to animals) are enabled to get a firmer hold upon the succession of ideas caused by the succession first produced in the senses, are not purely arbitrary, but arise according to fixed laws. This doctrine of association, however, merely evades the problem of how the "similarity" between such involuntarily associated ideas can be accounted for if the original naming was purely arbitrary.

Ultimately, however, the arbitrary character of the definitions, of the "names" of which they are constituted, is not consistently maintained. Thus even in the first stage of method, analysis, there is a departure from the strict analogy with mathematics. The free creation of the initial postulates of philosophy, for instance, upon which the first part of the mathematical analogy depends, is not unreservedly maintained. For his insistence that principles must be "known in and for themselves", suggests a kind of "intuitive" knowledge of their existence rather than their purely verbal construction, which is sustained by his description of the analysis of given sense experience requisite
for their discovery. Their establishment, in short, is not devoid of material considerations as in mathematics, but is, on the contrary, closely governed by the nature of reality; definitions are based on *empirical* concepts. The imposition of names is further limited by the fact that we are forbidden to give two contradictory names to one thing—an admonition incomprehensible if "reality" is of no relevance to their application, if their construction is purely arbitrary.

These reservations apart, however, Hobbes does not consistently suggest that "naming" is the arbitrary process it first appeared (and, *a fortiori*, the premising definitions of the professed quasi-mathematical order). The logical status of names, we find, changes in the course of his argument. At first they appear to have rather a mnemo-technical significance. Names are arbitrarily imposed upon things in order to recall the ideas of these to mind (this aid depending upon association by contiguity). Hobbes goes on to claim, however, that it is the use of "names" which makes science possible to man; and in the treatment of science onto which he then embarks, the mnemo-technical significance of the name imperceptibly lapses into a logical significance, the name becoming equivalent to the logical concept. His account at this point is obviously vague and oversimplified; in the "name" Hobbes believes himself to
have found the essential connection between empirical and philosophic knowledge, and the means of transition from the one to the other, but this is apparently so only because the meaning lent to "names" alternates between "mnemo-technical aid" and "logical concept".

It is noteworthy that Hobbes later recognises more explicitly that the original doctrine of "names" is not, in the last resort, sufficient for his theory of knowledge. In the chapters on Logic in the De Corpore, the truth or falsity of a proposition is made analytic. But the problem then arises of how, if names are taken to be mere images, this is to be decided - of how a "subject" which is but a corporeal image, can be contained within a "predicate" which is likewise. (In this respect it may be suggested that his formalism becomes inconsistent with his nominalism). Perceiving this difficulty, Hobbes corrected his view in such a manner as to change quite radically the original theory, coming to maintain that a second feature is contained in scientific knowledge. In addition to the formal truth of a proposition, the notion of "evidence" appears as an important condition. By evidence he seems to mean the fact of being conscious of what is in fact denoted by the words employed in drawing a conclusion.

"For if the words alone were sufficient, a parrot might be taught as well to know a truth as to speak it . . . For this evidence, which is meaning without words, is the
life of truth; without it truth is nothing worth..." (Elements. VI. 3.) *

This concept of evidence (absent from the discussion of Logic in the De Corpore) is a witness by Hobbes of the insufficiency of his own theory of reasoning as but the stringing together of names by means of the word "is". It further suggests that the mathematical pattern of "formal" knowledge, in turn, may not be rigidly adhered to in his philosophy as a whole.

We must, therefore, return to enquire how far the mathematical structure of knowledge is maintained in the second stage of the method itself, that of synthesis from the first principles so reached. Two chief demands which had to be fulfilled: if Descartes' difficulties were to be avoided, we said, were the retention of a homogeneity between starting point and conclusion, and in the subject matter. In confining philosophy to a computation with "names", with arbitrary rather than "real" definitions, Hobbes seems to fulfil the first of these demands, and by the reduction of all phenomena to matter and motion, universally describable in mathematical terms by the laws of motion, to comply with the second. Reasons have been suggested, however, for doubting the consistency with which Hobbes maintained the

* Reference taken from Brandt; Thomas Hobbes' Mechanical Conception of Nature.
first of these positions: the second aspect of his procedure, in so far as it involves the introduction of further material, extra-mathematical assumptions, may in turn be questioned.

The reduction of all phenomena to matter and motion is set forth in the second stage of method, the synthesis, in which everything is shown to be deducible from the first principle of motion, (together with the correlative notions of space and body). By this means, it is thought, the Cartesian dualism can be overcome, and the homogeneity of the universe maintained. There are, however, features in the resultant philosophy which suggest that mental phenomena cause more difficulty for Hobbes' metaphysics, for the uniformity of his method, than he was willing to admit. The two major cracks which appear in the deductive development of his system are connected with this point; they are between matter and mind, and between mathematics and physics.

Mental processes are not in fact proved by Hobbes to be corporeal, but, by means of his "image" theory of ideas, simply asserted to be so. Despite this assertion it is, nevertheless, notable that in certain contexts, these mental processes are not simply introduced as deductive consequences of the laws governing all matter, but are in fact taken on their face value, as significant data for a special form of observation - introspection. Consequently in his ethical
and political philosophy we find Hobbes taking these facts of self-observation as \textit{new} starting points for deductions. Hobbes the empiricist is more in evidence than Hobbes the rationalist here; the science of politics must be founded upon the discovery of "ineluctable human motives" which every man may find within himself. The principles concerning human feeling and impulses upon which civil philosophy is based are to be found not by a series of deductions from geometrical first principles, but directly, "every man reading mankind in himself".

While putting forward this inductive psychology, Hobbes the Rationalist assumes, of course, that its data could in \textit{principle} be deduced from his original premises; but this assumption he never justifies. It would seem, in point of fact, to be mistaken, since, having recognised mental processes as a distinct class of events, he can but assume their correlation with the strictly physiological events, which alone are strictly deducible from the laws of motion.

The second break in the deductive sequence appears between mathematics and the knowledge of the natural world gained by Physics. For the latter is concerned with knowledge of causes to be obtained from observation of effects, and as such has not the certainty of mathematical knowledge. From given "effects" it is only possible to reach \textit{hypothetical} knowledge of how the phenomena may have been produced,
it being possible for several different causes to have brought about the same effect. Thus the actual principles employed by the "author of nature" in a single instance cannot be decided upon purely deductive grounds, but only suggested by returning to empirical observation and inductive argument; they are not "constructed" by man himself, but sought in natural phenomena and stated as conditional "laws".

The difficulty found in deducing the events of physics from quasi-mathematical first principles is again closely linked with that associated with mental processes, and their deduction from the corporeal. For this doctrine of thinking with which Hobbes opposed the Cartesian dualism, committed him to giving an explanatory account in terms of body and motion of the "images" formed in this mental activity, and they in turn led him to an elaboration of the Galilean distinction between primary and secondary qualities. Hobbes felt it necessary to show the "subjectivity" of the data of sense-experience - their status as secondary qualities, arising from a conflict of motions within the organism provoked by the movements of "bodies" in the external world.

Thus, the qualitative phenomena which form the data of physics, are, according to Hobbes, accounted for by the perceiving subject. Their "objective" causes are indeed reducible to motion on his theory, but the connection between the subjective and objective factors is not established.
The interruption of strict deductive argument between mathematics and physics is in this way a function of the gap between matter and mind which still remains in Hobbes' philosophy. The vague analogies drawn between the perceptions and the actual happenings in the physical world to some extent conceal this rift. Hobbes attempts to describe the mechanism of perception in terms of imagery derived from the physical world, but the sense qualities are not themselves mathematically deduced from the first definitions comprising the laws of motion; they are not treated strictly as mere "effects" of the external motions which are said to be their causes. The correlation of these various sense qualities with external stimuli is accepted rather as a given and unexplained fact of experience. Similarly with the other two classes of events to be "reduced" to motion: the fundamental passions of human nature are not in fact deduced from movements within the organism, but, together with mental processes, are simply asserted to be but instances of matter in motion.

In short, Hobbes' theory of science or philosophy departs from a consistently mathematical pattern at three main points.

In the first place, we find in Hobbes a pronounced attempt to fuse real and formal knowledge. The resulting knowledge would then, it might appear, retain the certainty
of mathematical knowledge, whilst obtaining, as it were, a character of reality. Such an endeavour, however leads him away from the strictly mathematical analogy. The doctrine of arbitrary definitions, for instance, emphasised in the De Corpore was not consistently maintained, the notion of "evidence" being later admitted as a significant factor in their construction and in the validity of deductions from them of "real existence". But if the pattern of reasoning within philosophy were strictly analogous to that of mathematics, Hobbes would need strictly to adhere to a conception of the definitions forming the premises of philosophical reasoning as analogous to those from which mathematical deductions proceed: likewise, the reasoning must involve no reference to "real existence" if the required homogeneity of type between premises and conclusion is to be achieved.

Secondly, Hobbes equally departs from the homogeneity of subject-matter demanded by any quasi-mathematical analysis in, for example, his theory of introspection by which the basic principles of human nature (upon which civil philosophy is founded) are discovered, instead of being "deduced" from the initial mechanical postulates. For this assumes that there is a peculiar class of events in man's life observable in a special way. Although when seeking the cause even of sense Hobbes had contended that "memory" was
sufficient to account for the perceived need of some other "sense" by which to take note of sense, he nevertheless remarks that we "do take note in some way or other of our conceptions". This ability, however much the distinctive character of "consciousness" is slurred over, surely indicates a recognition of a distinct peculiarity in the mental phenomena of man; a peculiarity which makes him, however closely related to the rest of the natural universe, a subject of special enquiry.

Thirdly, we find that the Law of Motion is not, in the "synthetic interpretation" following the "analysis" of empirical data, an all-sufficient principle of explanation, since it required the support from the beginning of other assumed postulates, and also the later introduction of material propositions to bear out his subsequent deductions. Prominent instances of the subsidiary postulates which supplement the statement of the first principle of motion are the Laws of Causation, of Inertia, and of Conservation of Matter. Sometimes the Laws of Causation and Inertia seem, indeed, to be invoked in order to demonstrate that all change is motion, and sometimes attempts are made to prove them. But in all cases, the process of demonstration really presupposes the thing to be proved. Thus the principles by which the Law of Motion is supported in subsequent deductions are themselves "assumptions", whose precise
relation to each other and to the first principle of motion remains undefined. They simply bear out the inadequacy of the first principle of itself to carry the weight of all subsequent deductions. More illegitimate still, in the strictly mathematical analogy is the further introduction of material propositions at various later points in his discussion to help out the initial definitions. The propositions concerning the cognitive and motive powers of man, for instance, whose appearance as direct "inductions" within the "mental sciences" was noted above, make it quite clear that the principles of ethics and politics are not strictly deduced from general principles of motion, but are derived from empirical observation of human nature.

In sum, the principles of motion are neither the abstract definitions, analogous to those of mathematics, which they first appeared to be, nor can they alone account for the events supposedly deduced from them. Motion can only produce motion; the mechanical principles disclosed by analysis are necessarily inadequate to reconstruct the complex processes from which it took rise and the appearance of "conceptions", "feelings", "consciousness", etc., at certain points, in addition to motion, remains inexplicable. The rigour of Hobbes' system, however, is of the utmost value in exposing the limitations of his own pattern of thought, of the materialistic philosophy to which the systematic pursuit
of mathematical methods and ideas must lead. His philosophy, no less than that of Descartes and Spinoza, has indicated some respects in which despite their initial "co-ordinating value", philosophical reflection must be carried beyond mathematical analogies. At the same time, this illustration of the first aspect of the indirect "self-criticism" put forward as an important feature of Rationalist philosophy has also been accompanied by the second, that fulfilled by the history of philosophy itself. The alternative emphases of Spinozistic and Hobbian accounts of method, whatever the defects which they too encounter, have supplemented and corrected some of the inadequacies of the Cartesian, and in this respect, too, have afforded a significant critique of abstractions.
CONCLUSION.

In the foregoing chapters, we have discussed the relations between philosophy and different forms of abstraction, and have suggested some ways in which philosophy not only ought directly to provide, but has, historically speaking provided, in effect, an indirect critique of abstractions. The discussion has been graduated from the more abstract considerations of Section I, through the historical, but still general examination of some effects of one type of philosophical "abstraction" applied in a sphere significantly differing from that of the original source (Section II) to the more specific description of concrete instances in the Rationalist systems of 17th century philosophy (Section III).

This programme was designed to fulfil three purposes.

First, to clarify the notion of "abstraction", its nature and potential dangers in various fields, together with the more peculiar form it takes in Philosophy itself. By comparing these different orders of abstraction, it was hoped to indicate more clearly the potential "critical" value of philosophy in this respect, this relatively abstract survey thus serving to introduce the subsequent concrete examples of its working in practice.
Secondly, to describe some of the ramifications of the particular "analogue abstraction" involved in 17th century Rationalist philosophy. The comparison of actual scientific methods and theories, on the one hand, with the selective interpretations, exaggerations and extensions of these methods by philosophers, on the other, brings out more clearly the precise nature of the 17th century Rationalist abstraction, its attendant errors and some problems it created for subsequent philosophy. This is carried further by considering some effects of superimposing the mathematical pattern of thought upon a current political notion, that of Natural Law.

The third chief intention was to show more precisely the extent to which selected Rationalist philosophers did reveal some of the defects of the mathematical "unity pattern", and thereby exposed the inherent limitations of its method and categories. In this way, it was suggested, these philosophers paved the way for a clearer understanding of the scientific from which the analogy was taken, and also, between them, afforded examples of the inadvertent self-criticism, the mutual correction and supplementation which is to be found within the history of philosophy.

Throughout the thesis, the relationship between philosophy and the use of abstractions has been considered from two main points of view. The first, deriving more directly
from the opening citation from Whitehead, emphasising the important task of philosophy in criticising the diverse abstractions implied in the methodology of specialised studies such as science and history. It points to the concern which philosophers ought to have for co-ordinating the different perspectives and ranges of these studies, for elucidating the different presuppositions they work with, and the different questions they ask about the world; thereby helping to achieve balance and due proportion between them.

The second point concerned the significance of such "criticisms of abstractions" (as indirectly achieved) in estimating the practical value of metaphysical thinking and the "justification" of its synoptic method. Whilst by no means suggesting that this was the sole value of metaphysics, the historical illustrations were directed towards revealing the way in which such "criticism" may be evoked by the systematic development of certain ideas and methods within metaphysical theories. In conclusion, accordingly, these two aspects of the relationship may be briefly reviewed (the order of their presentation being, however, reversed).

The preceding chapters have shown that metaphysical systems, though themselves based upon abstractions, may in fact make an important contribution to the philosophic task of criticising such abstractions, since a "sustained interpretation" in these terms reveals more clearly their nature and
presuppositions; and this lends support to the earlier contention that, "pragmatically" at least, the process constitutes a measure of defence for the "rationality" of a synoptic employment of Reason.

For what more direct justification is it reasonable to seek? By the nature of philosophy it could not be obtained as it can in those specialised branches of knowledge, whose proper methods, modes of reasoning and categories can be said with some degree of precision to follow directly from the character of the object of study. Such a deduction from a definition of the proper object of philosophic study is impossible, since this object is not some limited field of order, but is all-inclusive; the peculiar difficulty of stating the nature and methods of philosophy is that it is always a "voyage of exploration" whose completed end remains unreached.

Nor can pragmatic justification be given in the same sense as it can for the principles and methods of empirical science, since philosophy is not concerned to make predictions, the validity of which may be confirmed in subsequent experience. The experimental observation which yields scientific knowledge of the behaviour of particular substances, or of

* The use of "pragmatic" here clearly differs from that in connection with science which is concerned with prediction and experimental verification. The use of inverted commas in respect of philosophy signifies this difference.
or of particular cause-effect relationships within phenomena, for example, can be of no relevance to the philosophical problems concerning "substance" or "cause" in general, nor the methods of solving the one to the solution of the other.

Metaphysics is not a science. It includes reference to empirical data, but its theories cannot be experimentally "disproved"; it includes logical deductions as in mathematics, but its theories cannot be "proved" either. It is not, in short, a body of formulae giving "right answers" or prescribing infallible rules and methods for obtaining "right answers" to certain definite problems. The rationality of its procedure can, therefore, only be exhibited within the activities of criticism, synopsis and speculation themselves. It may be said that the function of philosophy is not to state in the manner and terminology of science, but to "show". This recognition is not only instructive in regard to the content of philosophy; it is equally impossible to give an adequate, logically-justifying meta-theory of the employment of synoptic reason in philosophical method. The philosophical justification of philosophy cannot be stated in precise logical formulae, but, like the end of philosophical reflection upon any problem, is ultimately "sheer disclosure".
That is to say, it can only be sought by travelling some way with the opponents of metaphysical philosophy, and seeking in the activity itself a valuable critical function which, in its very process, gives evidence of a function of Reason wider than mere analysis.

The recognition of a Reason "wider" than that of a single methodology afforded by this disclosure, is important in two different ways: as enriching philosophy itself; and as an antidote to that "specialist" dogmatism which made the critical function of philosophy so vital to the progress of human knowledge and understanding.

Where Reason is narrowly conceived as simply a principle of analysis, philosophy is liable to become sterile and of little relevance to the problems with which men are most intimately concerned.* The power of synthesis is not in such circumstances denied, but is often relegated to the imagination (as, for example, by Shelley, who accordingly spoke of Plato, Berkeley and even Bacon, as poets); its best fruits are sought not in philosophy but in literature, where, "the penetration of literature and art at their height

* "The intimate timidity of professionalized scholarship circumscribes reason by reducing its topics to triviality, for example to bare sense and to tautologies. It then frees itself from criticism by dogmatically handing over the remainder of experience to an animal faith or a religious mysticism, incapable of rationalisation. The world will again sink into the boredom of a drab detail of rational thought, unless we retain in the sky some reflections of light from the sun of Hellenism."

arises from our dumb sense that we have passed beyond mythology: namely, beyond the myth of isolation." (Whitehead.*)

Historically, the tendency to allow "reasoning" on the pattern of mathematics the monopoly of the field of Reason, and to confine philosophical thought to the processes of logical reasoning, has often led to some form of anti-intellectualist reaction; that, for example, of the post-Kantian Idealists against the abstractions of scientific understanding; of anti-intellectualist philosophers such as Bergson; and of the modern rejection of reason and appeal to emotional and pragmatic interests in the spheres of morality and law (e.g. Sorel's "Myths").

It seems to some philosophers necessary, therefore, to call for a more liberal view of Reason "which will sanction the inclusion of intuitive reason, aesthetic and scientific imagination and the higher levels of emotion and moral and religious faith within the scope of intellectual life." **

There is, as it were, a rationality of imagination as well as of thought; of Art as well as of Science. As Boyce Gibson truly remarks,

"We recognize a rationality in expressive loveliness and do not confuse it with the rationality of a problem or a theorem. Similarly with the moral order and the moral

---

* Modes of Thought. Chapter I.
** de Burgh. The Life of Reason.
life. The orderliness here is not set out in propositions but in deeds; in actions that seek conformity with an ideal of goodness or rules of right, revealing some in- ruling logic of sentiment and spiritual power that clashes with evil rather than with error, and builds up not a system of ideas, but a virtue, a character or a happy life."

(The Meaning of Philosophy.*)

Yet philosophy is concerned with the propositional expression of ideas and experiences. To extend "Reason" to cover every mode of contact with experience, however subjective and incommunicable, is to empty the term of meaning. Philosophy must indeed take account of these orders of "rationality". For it is concerned with facilitating "vision", and the primary purpose of its reasoning is to render this possible and intelligible. To this end, therefore, the experiences it describes must include all these things - "Philosophy proceeds by description, it only uses argument in order to help you to see the facts, just as a botanist uses a microscope," (Alexander); and it must likewise do full justice to the facts.

In so far as its aim is to articulate the experiences it is describing in a logical form, however, the statements of philosophy must be so ordered as to appear rational in the traditionally accepted logical sense, even if this does in fact prevent completely adequate expression from being given to all aspects of experience. That is to say, it cannot embrace paradoxes and contradictions, claiming these to be the insignia of its "deeper rationality", as against the

* Australasian Journal of Psychology and Philosophy.
superficiality of "mere logic"; its reasoned arguments cannot, if incommunicability and subjectivity are to be avoided, be patterned upon a "logic of emotion" or a "logic of action" or "historical process". The inevitable inadequacy of philosophy to describe completely all aspects of experience - an inadequacy associated with any linguistic expression of concrete, lived experience, since "everything is what it is, and not another thing"* - affords no grounds for extending the term Reason to embrace the peculiar modes of immediate experience which it must nevertheless take into account. The important thing is that they be taken into account - that the synoptic function of Reason be extended to cover all such aspects of human experience, integrating and relating them to the more formalised branches of knowledge which abstract from them.

Philosophy itself has likewise brought out the second respect (cf. p. 295) in which rational synthesis is of paramount importance. It is perhaps in this connection that even the gravest exaggerations of the Idealists, of their anti-scientific polemics and soaring speculations, may best

* Thus, "no language can be anything but elliptical, requiring a leap of the imagination to understand its meaning in its relevance to immediate experience. The position of metaphysics in the development of culture cannot be understood without remembering that no verbal statement is the adequate expression of a proposition."

be understood; that even in their most pontifical pronouncements may be found an indication of the critical function which philosophy in its broadest sense can perform. For in objecting to an uncritical acceptance of the "finite truths" of science, for instance, such writers were upholding valuable elements in the Platonic tradition which seemed to have been overlooked by the inheritors of the scientific advances of the 17th century. The Socratic emphasis upon the insignificance of human knowledge by comparison with the magnitude of epistemological problems as a whole, is essentially a warning against dogmatism - a reminder that the results of scientific investigation are provisional and open to subsequent modification. Reflecting along similar lines, the Idealist philosophers of the 19th century adopted Spinoza's definition of error as residing in "inadequate ideas" to a theory of truth and error in which the essence of the latter was partialitas masquerading as totalitas.*

There was, at the time of their writing, an urgent need to point out the frequent source of error residing in unjustified claims of universal importance or validity for a partial truth. Their actual statement of this correction was perhaps a little unfortunate; they implied that anything

---

* This is not to interpret Spinoza in terms of a Coherence theory of truth, but simply to indicate the adaptation of some of his ideas to the purposes of the latter theories, however mistaken as regards Spinozistic interpretation this may be.
less than the whole Truth was not worthy of the name, that
the piece-meal labour of scientists was of little value for
the understanding of the world which the wise, i.e. the philos-
phers, sought. Understandably, scientists and scientist-
philosophers were less receptive of the valuable considera-
tions which such thinkers were in fact bringing forward.
Moreover, they went too far in asserting partiality to be
the essence of error, since, to mention but one important
point, it does not account for a statement which is erroneous
even within its own context. It is, however, frequently
the chief source of philosophic error and the indication of
this was an important purpose behind the doctrine of "degrees
of truth" as held by some Idealists at least.

"A proposition is never untrue simply because it is not
the whole truth, but only when, not being the whole truth,
it is mistakenly taken to be so. If we sometimes speak
in Philosophy as though whatever is less than the whole
truth must be untrue, that is because we mean it is untrue
for our special purposes as metaphysicians, whose business
is not to stop short of the whole truth. For purposes
of another kind it may be not only true, but the truth." (Taylor. Elements of Metaphysics.)

So understood, the emphasis of such philosophers is
directed towards showing the confusion and error attendant
upon any failure to appreciate this distinction, upon ig-
noring the fact that what is good for science is not good
enough for philosophy, since scientific principles which are
rational and satisfactory within their own sphere are seldom

* Cf. also discussion in Emmett of the "systematic ambiguity"of the notion of truth, in the British Academy Lecture,
"Presuppositions and Finite Truths."
adequate for philosophy as ultimate principles of explanation. Thus, the vicious form of "specialist" abstraction occurs when the statement of a particular finite truth, valid, like the methods of its attainment, for the working purposes of the context within which the statement is made, the method elaborated, is unquestioningly asserted outside that limited context or "frame of reference". This may, indeed, also be a source of error within the sciences. For example, if the biologist is concerned with a few generations only, the species are fixed, as Aristotle said; if the time span is longer they are not. (Similarly with spatial restriction - when considering the train journey from London to Tilbury, the earth is flat; but if thinking of the journey to New Zealand it is round). But the error is perhaps more far-reaching in philosophy, and in this respect the Idealists' conception of the world as an "organic whole", their insistence upon the "internal relationship" of events one to another, and the idea of "Absolute Truth" itself, are useful "regulative ideas" urging men to look beyond those principles, methods and concepts employed with pragmatic success within a single abstraction.*

* "The demand that the universe shall be made conceivable as a whole is in essence the demand that each of its main features shall be shown in significant relation to the rest, each being seen to play its part in a general plot or plan for which it is indispensable."

Stocks. Time, Cause and Eternity.
This was, moreover, a valid criticism of a method of thought which analysed to the extent of neglecting the underlying unity which the very possibility of analysis presupposes. It is noteworthy that, in the 20th century, scientists themselves appear to have much more regard for the "whole", and to recognise that detailed investigation must be guided by constant return to the complex unity upon which analysis has been carried out. The associated idea of teleology is similarly reintroduced in some branches of science as a valuable guiding idea, giving direction and cohesion to new advances in detailed understanding of the natural world as a whole.

With this idea of "wholeness", of the part played by the idea of an "organic unity" forming the background to individual theories and approaches to knowledge, we are led from the "pragmatic justification" of synoptic thinking provided, in part at least, by the metaphysical "criticism of abstractions" already referred to, back to the starting point of this discussion: the philosophic task of making men aware of the abstractions which their several approaches to knowledge inevitably involve. For apart from their direct bearing upon certain aspects of scientific research, these ideas have a wider epistemological significance. As Collingwood points out in his logic of "question and answer", they are necessary presuppositions of any attempt to assign truth or
or falsity to a proposition. That is to say, no proposition can successfully be treated as atomic, since each necessarily occurs within a context, to which it owes at least part of its meaning and truth. Thus, truth is not a quality predictable of an entity taken simply "in itself", but only of a relation between entities constituting a systematic whole of a minimum degree of complexity. To show this, by examining the different questions which must be framed and asked by those engaged in research if knowledge of any kind is to be achieved, and in this way to relate the conclusions reached, the "finite truths" discovered, to their essential context, is a necessary preliminary to the critical revision of the different modes of abstraction of which Whitehead speaks. Only then does it become more apparent in what ways statements may have to be re-interpreted and modified when placed in a wider context than that within which the conditions required for their truth were known to hold. Only then does it become clear how all branches of knowledge are selective and directed toward different ends, which thus determine their characteristic "points of view"; and how "... in all systematic thought there is an element of pedantry". (Whitehead.)

In sum, the importance of philosophy's critical function in respect of the abstractions of specialised studies is both practical and social.
Its practical importance arises from the fact that any assumption of complete autonomy for particular studies, of the self-sufficiency and finality of their immediate conclusions, is a form of obscurantism. It neglects the fact that progress in knowledge, the opening up of new vistas, proceeds largely through argument by analogy from one field to possibilities in another; it may, indeed, be a direct obstacle to the recognition of such possibilities of advance. The boundaries of the various spheres constituting "the spectrum of knowledge" are indeterminate; frequently the most significant problems, and the inspiration for new discoveries, are to be found at their points of intersection. Thus specialisation carried too far tends to defeat its own ends.

The growth of a specialism, moreover, seldom leaves wholly unaffected the presuppositions which seemed necessary and sufficient for its early stages. This has been historically illustrated within Physics, for instance, in respect of the theory of light. The Greeks regarded light as something which travels in a straight line from its source - a supposition which accounted for the appearance of shadows. Euclid's definition of a straight line can be taken as saying that a straight line is that which has the form of a ray of light in a homogeneous medium. This conception sufficed for all classical geometrical optics - the Laws of Reflection
and Refraction being based upon it - and even to the present day nearly all calculations of the power of lenses for microscopes and telescopes are done in these terms. Nevertheless, such presuppositions, however valid for large-scale work, were subsequently proved inadequate for the smaller-scale phenomena with which Newton and his contemporaries were primarily concerned. Small-scale effects such as colours on thin films, and the indefiniteness of the edges of shadows, were alternatively explained by the wave theory of light. The latter could also account for the "ray" or shadow in cases where the obstacle was very large and the wave length of the infringing waves very small. Thus it sufficed until the end of the 19th century, when Planck found that light (or other radiant energy in some form) was not in fact absorbed or emitted at surfaces in a continuous fashion as the classical theory predicted, but discontinuously in bundles, the size of the bundle depending upon the wave length. This illustrates science's inability to rest upon any set of presuppositions as "final" at a particular stage in its development. For Planck's discovery demands in one sense a reversion to the "ray" - that is to say, light is now conceived as a volley of "photons" emitted by the source and travelling away from it in a straight line - although only in one special sense, as the photon or quantum effect only appears at a surface when light is emitted or absorbed, not in the interven-
ing medium.

In addition to the apparent dependence of such presuppositions with which the scientist works upon the nature and stage of development of the sphere under investigation at a particular time, the less "fundamental" theories formulated in any branch of science usually seem to require modification in the light of new knowledge. It is noteworthy that even a writer to whose generally high claims for scientific knowledge reference has already been made, has admitted that "many social scientists have formulated laws in terms which do suggest they are more widely applicable than is in fact true." (Wootton.) She cites the example of Malthus and the wage laws, which have been corrected by later work because they rested upon concealed premises only later disclosed. They were only partially true in particular conditions, the universality of which was implicitly and quite incorrectly assumed.

Such considerations, then, indicate the practical necessity of keeping systems open and remaining conscious of their limitations, and of the artificiality of the boundaries which have, for simplicity and clarity of method, been drawn around the field of specialised study. "There is always a vague beyond waiting for penetration in respect of its detail", in virtue of which the fields distinguished are not metaphysically distinct.
The social importance of the "criticism of abstractions" effected by synoptic philosophy relates chiefly to the background of general convictions which, as was pointed out in Chapter III, inevitably circumscribes all thinking. Such convictions express prejudices and previous evaluations of different kinds whose influence becomes the more insidious when they remain unrelated to the particular contexts in which they were formed. It is, therefore, an important task of philosophy to undermine any pretension to autonomy on the part of particular specialised studies, since a claim of this sort merely conceals the fact that judgements strictly falling outside the study per se are nevertheless being uncritically assumed, and the important ramifications of the problems studied thereby ignored. This is particularly so in regard to value judgements, which, however "objective" and "scientific" the historian, the psychologist and sociologist, for instance, may claim to be, are inextricably involved in his study. The point is worthy of emphasis if only because of the subtle way in which uncriticised value judgements do insinuate themselves into discourses which even profess to deny their validity — while often deriving much of their effectiveness and apparent plausibility therefrom. Marxism, for instance professes to repudiate all idea of objective rightness and wrongness, goodness and badness, explaining these concepts in terms of economic and social
processes. Yet, the appeal of these doctrines to intelligent men derives in no small degree from the moral terms in which they are couched: from the fact that they address human moral consciousness, reminding man that certain evils ought to be overcome and recommending in what certainly appear to be "absolute" terms, forms of conduct, plans of action, whereby this can be done, the "better" state of affairs achieved. Implicit judgements that the means of effecting such change for the better (however ruthless and temporarily unhappy) are justified by the ultimate end, are no less value judgements than those of theological or "bourgeois" morality which these "scientific" socialists oppose. Similarly with the nascent "scientific" studies of social and individual human behaviour. The sociological "man-moulders", no less than their psychiatric brethren, presuppose some pattern to which human nature ought to be cut (conceived as the "ideal" or the "normal" according to the sphere of work and terminological preference) some end towards which human behaviour ought to be directed. And if these evaluations are not performed explicitly, if they are not recognised to be such and openly discussed, they are as earlier remarked, most likely to reflect the general prejudices of a particular society or Age or to be informed by the metaphysics suggested by the method of the particular science or other specialised study of professed expertise.
The danger of "specialist" dogmatism is not, of course, exhausted by the introduction of illicit or uncritical value judgements; it is, to take but one more instance, no less extensively apparent in regard to the recommendation and adoption of methods of enquiry. To render a subject as far as possible "scientific", by pursuing it along the lines of enquiry and by the methods dictated by the natural sciences, is frequently equated with "rationality". But this procedure begs the all-important question of whether the subject-matter of the new study is in fact precisely similar in the significant respects to that of the natural sciences. An a priori assumption that human beings, for example, may be exhaustively studied along scientific lines, that man's behavioural characteristics, psychological and moral problems can be investigated solely by the methods and canons laid down as a result of non-human studies is misleading. It may produce "testaments"* of various kinds which provide stimulus and suggestions for research; but in so far as the method of research is dogmatically prescribed, such initial value is overweighted by the subsequent "closed system" of study it presents. In consequence, the problems concerned are inadequately dealt with and incompletely understood,

* Having in mind, of course, Wootton's Testament for Social Science.
because the answers to them have been dictated by the presuppositions, the restricted and biased questions asked, before the work of investigation has begun.

One important safeguard against such errors, a safeguard of social importance and even urgency, is that the diverse approaches to knowledge be brought into relation with one another, and that the professed "objectivity" of scientific studies should not exclude recognition of the fact that outside the very limited "frame of reference" in which this is in some measure achieved, assumptions and evaluations are made whose bias may be "criticised" and corrected by taking into account other fields of study and prime facie alien considerations. In short, as Bradley recalls,

"... our one way of safety, whether in theory or life, is more or less to keep in mind the danger inseparable from our use of abstractions... Everywhere, we should be ready to recall that our judgements fall short of, and are subject to correction by, the entire truth - however much for the present purpose we have a right to believe that such a correction would not be material."

The logical and historical considerations of the preceding chapters have been directed towards the development and "justification" of the claim for the social importance of philosophy as the critic of such abstractions. It has been suggested that philosophy, by virtue of its subject-matter, can be an effective antidote for departmental dog-
matism. This depends not upon its ability to embrace a wider scheme of things into which everything can be fitted—which tends to lead to dogmatism on a wider scale—but upon the fact that it is not committed to any rigid method, and can therefore criticise the presumptions of a particular discipline by pointing out that, as extended, it is inadequate for other branches of enquiry. Thus one way in which philosophy fulfils a useful critical function is by resisting any attempt to foreclose discussion for the purpose of safeguarding a particular methodology. That is, this order of philosophical criticism does not imply the application of a superior or more general method, but rather constitutes a reminder that the chosen scheme is a method, not a metaphysic, whose validity is relative to the nature and purpose of the enquiry it purports to regulate.

Although this more direct mode of criticism does not necessitate the construction of a philosophical system upon the basis of a particular discipline, as was the wont of mathematically and evolutionary minded metaphysicians, the latter procedure too does, however, form a further important way in which the work of criticism gets done. For the inherent limitations and evident inadequacies of categories and methods are often more clearly exposed by such philosophic systematisation, thus witnessing to the potential critical value of metaphysical systems. Moreover, philosophy stands
in a special relation to its own abstractions of this order, by providing its own criticism within the history of philosophy.

These two latter forms of metaphysical criticism towards the illustration of which the historical evidence was directed, both differ from the directly conscious examination of concepts undertaken by critical philosophy as generally understood. Nevertheless, from both the abstract and more concrete considerations brought forward in the course of discussion, it may be concluded that this indirect form of criticism implicit in metaphysical systems is nevertheless important if philosophy is to function effectively as a "critic of abstractions."
**BIBLIOGRAPHY**

**GENERAL**

<table>
<thead>
<tr>
<th>Author</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barfield, O.</td>
<td>Poetic Diction. Faber and Faber, 1928.</td>
</tr>
<tr>
<td>Author</td>
<td>Title</td>
</tr>
<tr>
<td>------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Cassirer, E.</td>
<td>Essay on Man.</td>
</tr>
<tr>
<td></td>
<td>The Myth of the State.</td>
</tr>
<tr>
<td></td>
<td>The Problem of Knowledge.</td>
</tr>
<tr>
<td></td>
<td>Philosophy of the Enlightenment.</td>
</tr>
<tr>
<td>Eddington, Sir A.</td>
<td>The Philosophy of Physical Science.</td>
</tr>
<tr>
<td></td>
<td>Presuppositions and Finite Truths.</td>
</tr>
<tr>
<td></td>
<td>Whitehead's Philosophy of Organism</td>
</tr>
<tr>
<td>d'Entrèves, A.D.</td>
<td>Natural Law.</td>
</tr>
<tr>
<td>Farrer, A.</td>
<td>The Glass of Vision.</td>
</tr>
<tr>
<td></td>
<td>Finite and Infinite.</td>
</tr>
<tr>
<td></td>
<td>Letter to the Grand Duchess Christiana.</td>
</tr>
<tr>
<td>Gierke, O.</td>
<td>Natural Law and the Theory of Society, 1500-1800.</td>
</tr>
<tr>
<td></td>
<td>The Development of Political Theory. Trans.</td>
</tr>
<tr>
<td></td>
<td>The Unity of Philosophical Experience.</td>
</tr>
<tr>
<td></td>
<td>&quot;Metaphorical Thinking.&quot;</td>
</tr>
<tr>
<td>Gough, J.W.</td>
<td></td>
</tr>
<tr>
<td>Henderson, G.P.</td>
<td></td>
</tr>
<tr>
<td>Author</td>
<td>Title</td>
</tr>
<tr>
<td>------------------------</td>
<td>---------------------------------------------------------</td>
</tr>
<tr>
<td>Lindsay, A.D.</td>
<td>The Philosophy of Bergson.</td>
</tr>
<tr>
<td>Mabbott, J.D.</td>
<td>The State and the Citizen.</td>
</tr>
<tr>
<td></td>
<td>(I)</td>
</tr>
<tr>
<td></td>
<td>(II)</td>
</tr>
<tr>
<td>MacMurray, J.</td>
<td>Boundaries of Science.</td>
</tr>
<tr>
<td></td>
<td>Interpreting the Universe.</td>
</tr>
</tbody>
</table>


The Limits of Purpose. Benn, 1932.

Taylor, A.E. Elements of Metaphysics. Methuen, 1903.


The Vocabulary of Politics. Pelican, 1953.


Modes of Thought Cambridge, 1938.

Whitehead, A.N.  Process and Reality.  
                     New York, 1929.
Essays on Science and Philosophy.  
Willey, B.  Seventeenth Century Background.  
Wootton, B.  Testimony for Social Science.  

TEXTS AND COMMENTARIES FOR SECTION III.

DESCARTES.
Rules for the Guidance of our Mental 
Powers.  (Règles.)
Discourse on Method.  (Discours.)
Meditations on First Philosophy.  (Méditations.)
The Kemp Smith Translations.  Descartes' Philosophical Writings.  Mac-
millan, 1952.
Objections and Replies.  Descartes' Works, 
edited by Adam and Tannery, 1897.

Beck, L.G.  The Method of Descartes.
Boyce Gibson, A.  The Philosophy of Descartes.
                     Methuen, 1932.
Gilson, E.  Discours de la Méthode, Texte et 
Commentaire.
                     Paris, 1925.
La Liberté chez Descartes.
                     Paris, 1913.
Keeling, S.V.  Descartes.
                     Benn, 1934.
Macmillan, 1952.
Laporte, J.  Le Rationalisme de Descartes.

SPINOZA.

Alexander, S. Philosophical and Literary Pieces. (Two chapters on Spinoza.) London, 1939.
Duff, R.A. Spinoza’s Political Philosophy. Glasgow, 1903.
HOBBES.  

Leviathan  

De Corpore.  
Elements of Law.  
Molesworth, London, 1839.  

Brandt. F.  

Thomas Hobbes' Mechanical Conception of Nature.  

Croom Robertson, G.  

Hobbes.  
Blackwood's Philosophical Classics. 1886.  

Laird, J.  

Hobbes.  
Benn, 1934.  

Oakeshott, M.  

The Introduction to the Leviathan.  
Blackwell.  

---