CHAPTER - II

THE METHOD
In an autobiographical letter, written to a London physician, Hume spoke of a 'new Medium by Which Truth might be establisht', and a 'new Scene of Thoght' that made him apply wholly to philosophy (L 1 13-14). What this 'new Medium' or the 'new Scene of Thoght' might be, is a matter of conjecture. Mossner thinks that the 'new Medium' is the experimental method. In the beginning of his philosophical career, Hume was convinced that the experimental method could be applied with success to the moral subjects. Mossner also thinks that in choosing the sub-title to his Treatise, 'BEING AN ATTEMPT to introduce the experimental Method of Reasoning INTO MORAL SUBJECTS', Hume accepted the challenge thrown down by Newton at the end of the Opticks (1704):

> And if natural Philosophy in all its Parts, by pursuing this Method (inductive method), shall at length be perfected, the Bounds of Moral Philosophy will be also enlarged.

There are also other eminent Hume-scholars like N.K. Smith, Antony Flew, V.C. Chappel, J. Laird and J. Passmore, who think that Hume inherited the concept of experimental method from Newton. In this matter, the official view is stated by
Passmore: 'it was Hume's ambition to be the Newton of the moral sciences'. According to Passmore, the scientist influenced the philosopher in two respects: first, Hume's general theory of mind — his associationism — is modelled after Newton's theory of attraction, and secondly, his method is an extension of the Newtonian method to the moral sciences. N.K. Smith regards 'associationism' as a second generation of Newtonian influence in the evolution of Hume's thought. However, Smith thinks that Newton's influence with respect to associationism considerably faded out in course of the evolution of Hume's thought, but he agrees that Newton's influence with respect to method remained dominant. He remarks that Newton's conception of method, as explained in the *Opticks*, is precisely the method which Hume claims to be following in his own thinking. Newton applied the experimental method to the outer world, and Hume applied it to the mental world. Despite what these eminent scholars think about Hume's conception of the experimental method, it is remarkable that the *Treatise*, which is supposed to be more Newtonian than any other work of Hume, contains just one insignificant reference to Newton in the final paragraph of the Appendix. There, Hume explains what could be the correct meaning of 'vacuum' according to Newton's natural philosophy. On the other hand, he consciously places himself in the tradition of Bacon, Locke, Shaftsbury,
Mandeville, Hutcheson (Hutchison), Butler, etc. 'who have begun to put the science of man on a new footing, and have engaged the attention, and excited the curiosity of the public' (T xvii). He mentions the names of his worthy predecessors in a passage in the Introduction to the Treatise, which also contains the methodological manifesto of the work:

And as the science of man is the only solid foundation for the other sciences, so the only solid foundation we can give to this science itself must be laid on experience and observation (T xvi).

This makes us skeptical about the correctness of the official view, and we look for internal evidences to find out the connection, if any, between Hume's conception of the experimental method and Newton's conception of the same.

Newton belongs to the tradition created by Galileo Galilei (1564-1642). Nature presents herself to Galileo as a simple, orderly system, whose every proceeding is thoroughly regular and inexorably necessary. This necessity in Nature follows from her fundamentally mathematical character. Nature is the domain of mathematics. Galileo says:

Philosophy is written in that great book which ever lies before our eyes — I mean the universe — but we cannot understand it if we
do not first learn the language and grasp the symbols, in which it is written. This book is written in the mathematical language, and the symbols are triangles, circles, and other geometrical figures, without whose help it is impossible to comprehend a single word of it; without which one wanders in vain through a dark labyrinth.

We become familiar with Nature through our senses. But she does not disclose her reasons and methods of operating to the senses; mathematical demonstrations alone furnish the key to unlock her secrets.

Galileo's method of mathematical demonstration implicitly follows the distinction between primary and secondary qualities, which falls in line with the Platonic distinction between the real and the phenomenal. Qualities, such as number, figure, magnitude, position and motion, which cannot be separated from bodies-qualities which also can be wholly expressed mathematically—are primary qualities. All other qualities are secondary, subordinate effects of the primary on the senses. Real Nature is composed of primary qualities only, and the laws of Nature are the laws regarding the primary qualities. The success in the science depends on our ability to resolve the world of sensible experience into the world of mathematical objects, i.e. the permanent qualities, and to deduce valid conclusions from them.
Mathematics, particularly geometry, is very important to Galilean science. But observation and experiment are no less important in it. Galileo did not conceive of mathematical demonstration as an exclusively a priori method of reaching truth. He found it frequently convenient to appeal to the confirmation of the senses. He conducted many illustrious experiments to achieve empirical verification for his mathematically based theories. The moment he came to know of the invention of telescope by a Dutchman, he realised its importance, and made one himself. With the help of the telescope, he discovered a number of important things. He discovered the phases of Venus, which Copernicus knew to be implied by his theory, but which he could not demonstrate, as the naked eye was unable to perceive it. In every hypothesis of reason, error may lurk unnoticed, but empirical verification cannot be at odds with truth. Once Galileo wrote a letter to Kepler wishing to have a hearty laugh together at the stupidity of the 'mob' including the professor of philosophy at Padua, who tried to conjure away Jupiter's moons, 'using logic-chopping arguments as though they were magical incantations', though his telescope clearly demonstrate their presence in the sky. This letter reveals Galileo's pretty deep empiricism.

Viewed as a whole, Galileo's method can be analysed into three steps, intuition or resolution, demonstration, and
experiment. The world that is sought to be explained is the world revealed by our senses. Facing the world of sensible experience, we isolate and examine certain typical phenomenon, in order first to intuit those simples, absolute elements in terms of which the phenomenon can be most easily and completely translated into mathematical form. This is mathematical abstraction or idealisation. Much of Galileo's success in physics was attributed to his ability to bracket out various empirical complications in order to work with ideal concepts such as 'free fall in a vacuum', 'ideal pendulum', 'frictionless motion', and so on. Galileo was of the opinion that mathematical idealisation of physical nature is actually an act of calculation for which a sophisticated calculating machine, the mind, is necessary. Thus he wrote:

...just as the computer who wants his calculations to deal with sugar, silk, and wool must discount the boxes, bales, and other packings, so the mathematical scientist, when he wants to recognize in the concrete the effects which he has proved in the abstract, must deduct the material hindrances, and if he is able to do so, I assure you that things are in no less agreement than arithmetical computations. The errors, then, lie not in the abstractness or concreteness, not in geometry or physics, but in a calculator who does not know how to make a true accounting.
Have we performed the first step successfully, we get the real constituents of the phenomenon. In the second step, we carry on mathematical deductions which must be true to similar instances of the phenomenon, even though at times it should be impossible to confirm them empirically. For the sake of most certain results, however, we should develop, where possible, demonstrations whose conclusions are susceptible of empirical verification. Then, with the principles and truths thus acquired, we can proceed to more complex but related phenomena, and discover what additional laws are there implicated. Galileo made ambivalent statements about the utility of the third step, that is, experimental confirmation, but that he actually followed all these three steps in all of his important discoveries in his dynamics is ascertainable from his biographical paragraphs, especially in the *Dialogues Concerning Two New Sciences*. 

The success of Galilean exact science is remarkable. Yet the method of exact science makes certain presuppositions about the real Nature and man's place in it, to which the philosopher cannot always reconcile himself. The methodology of Galilean science demands that Nature be reduced to mathematically determinable simples. Man has no privileged position in this Nature's scheme. Thus the finest calculator that Galileo's mind was, could not yet be accommodated in his ideal mathematical world, as it was not a subject suited to
mathematical study. His performances could not be treated by the quantitative method except in the most meagre fashion. His was a life of colours and sounds, of pleasures, of griefs, of passionate loves, of ambitions, and strivings, which lie outside the real world. Consequently, man's ability to discover the real world, a fact which, being necessarily presupposed, was easily neglected in the Galilean science. 15

Newton (1642-1727) was born in the year in which Galileo died. He is the greatest of the founders of modern science, with the possible exception of Galileo. With Newton, the empirical nature of science became more evident. At the same time, the importance of mathematics for natural philosophy was once more demonstrated. Newton was as thoroughgoing an empiricist as he was a consummate mathematician. The chosen title of the work — Mathematical Principles of Natural Philosophy aptly expresses the fundamental place of mathematics in Newton's method. But Newton himself did not believe in mathematical apriorism. For him, there was absolutely no a priori certainty, such as Kepler, Galileo, and preeminently Descartes believed in, that the world is thorough and thorough mathematical, still less that its secrets can be fully unlocked by mathematical methods already perfected. 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 other less certain method.
Newton followed two distinct methods in his scientific investigations — the inductive method of analysis and synthesis and the axiomatic method. In both kinds of enquiry he used mathematics in abundance.

Newton opposed the Cartesian method by affirming Aristotle's theory of scientific procedure. He referred to this procedure as the 'Method of Analysis and Synthesis', and declared that 'although the arguing from Experiments and Observations by Induction be no Demonstration of general conclusions, yet it is the best way of arguing which the Nature of Things admits of'.

Newton's application of the Method of Analysis and Synthesis reached fruition in the investigations of the Opticks (1704). He also claimed to have followed the method of Analysis and Synthesis in his great work on dynamics, the Principia (1687). In this volume, he reported that he formulated the three laws of motion upon application of the Method of Analysis. Newton declared that in experimental philosophy 'particular propositions are inferred from the phenomena, and afterwards rendered general by induction. Thus it was that the impenetrability, the mobility, and the impulsive force of bodies, and the laws of motion and of gravitation, were discovered'.

According to Newton,
Analysis consists in making Experiments and Observations, and in drawing general Conclusions from them by Induction.... By this way of Analysis we may proceed from Compounds to Ingredients, and from Motions to the Forces producing them; and in general, from Effects to their Causes, and from particular Causes to more general ones, till the Argument end in the most general.\(^\text{18}\)

But it is not clear if Newton's laws were discovered by way of generalisations from particular phenomena. For example, the first law specifies the behaviour of those bodies which are under the influence of no impressed forces. But no such bodies exist. Consequently, the law of inertiae is not a generalisation about the observed motions of particular bodies. It is, rather, an abstraction from such motions. There are such other difficulties unjustifying Newton's claim about inductive generalisations. But Newton never ceased to proclaim his ultimate empiricism that the laws of Nature are clearly deducible from phenomena and are exactly verifiable in phenomena. Many often deductions from phenomena take the shape of mathematical generalisations and 'exact verifications' take place through articulated experiments. Thus, it is not surprising that Newton took offence whenever his experimentally based theories were labelled 'hypotheses'. 'Hypothesis non fingo' is a famous saying of Sir Isaac.

Newton followed an axiomatic method in the *Principia*. There are three stages in this method. The first stage is
the formulation of an axiom system which is a deductively organized group of axioms, definitions and theorems. The laws of motion are the axioms of Newton's theory of mechanics. They stipulate invariant relation among such terms as 'uniform motion in a right line', 'change of motion', 'impressed force', 'action', and 'reaction'. The terms have been defined within the system in such a way that the axioms describe the true motions of bodies in Absolute Space. Other theorems have been deduced from these axioms by following strict mathematical reasoning. In the second stage, a procedure has been introduced (Rules of correspondence) for correlating theorems of the axiom system with observations. It is thus that Newton proves that his mechanics have empirical significance. Newton enforced the distinction between an axiom system and its application to experience throughout the *Principia*. This distinction between axiom system and its empirical application is Newton's most important contribution to the theory of scientific method. It raised to a new level of sophistication, the ideal of the deductive systematization of scientific knowledge. The third stage of Newton's axiomatic method is the confirmation of the deductive consequences of the empirically interpreted axiom system. Newton himself established extensive agreement between his empirically interpreted axiom system for mechanics and the motion of celestial and terrestrial bodies.
Thus Newton affirmed and practised two theories of scientific procedure — the Method of Analysis and Synthesis, and an Axiomatic Method, though he did not keep in mind consistently the distinction between these two theories of procedure.

The Method of Analysis and Synthesis and the Axiomatic Method share as a common objective the explanation and prediction of phenomena. But they differ in an important respect, particularly if one takes a narrow view of what techniques qualify as 'induction'. The natural philosopher who follows the Method of Analysis seeks to generalise from the results of observation and experiment. The Axiomatic Method, by contrast, places greater emphasis on the creative imagination. The natural philosopher who adopts this method may begin anywhere. But the axiom system he creates is relevant to science only if it can be linked to what can be observed.

Newton was the common heir of the two important and fruitful movements in the development of science, the empirical and experimental, as well as the deductive and mathematical. He was the follower of Bacon, Gilbert, Harvey, and Boyle, just as truly as the successor of Copernicus, Kepler, Galileo and Descartes. If it were possible wholly to separate the two aspects of his method, it would have to be said that Newton's ultimate criterion was more empirical than mathematical. Continually he called in experimental verification,
even for the solution of questions whose answers would seem to be involved in the very meanings of his terms, such as the proportionality of resistance to density. Having defined mass in terms of density and also in terms of resistance, such proportionality would seem to be involved in the very meaning of the words. In the Universal Arithmetic, he even intimates that some problems cannot properly be translated into the mathematical language at all, a hideous heresy to Galileo or Descartes.\textsuperscript{19} It is not too much to say that for Newton mathematics was solely a method for the solution of problems posed by sensible experience. He was little interested in mathematical reasonings which were not destined for application to physical problems. They were essentially a helpful tool in the reduction of physical phenomena. Newton observes that which is perfectly accurate came to be called geometrical; what is less so, mechanical; but this distinction must not lead us to forget that the two appeared originally as a single science of mechanical practice. For example:

To describe right lines and circles are problems, but not geometrical problems. The solution of these problems is required from mechanics, and by geometry the use of them, when so solved, is shown; and it is the glory of geometry that from those few principles, brought from without, it is able to produce so many things. Therefore geometry is founded in mechanical practice, and is nothing but that part of universal mechanics which accurately proposes and
demonstrates the art of measuring. But since the manual arts are chiefly employed in the moving of bodies, it happens that geometry is commonly referred to their magnitude, and mechanics to their motion. In this sense rational mechanics will be the science of motions resulting from any forces whatsoever, and of the forces required to produce any motions, accurately proposed and demonstrated. 20

The empirical and practical stress here is central. Geometry is a part of universal mechanics. It and other branches of mechanics together make up a single science of the motions of bodies, and that science developed originally in response to practical needs.

We should expect then in Newton a strong insistence on the necessity of experiment and small patience with ideas about the world which were not deductions, through experiment, from sensible phenomena, or exactly verifiable in experience. He excluded 'hypotheses' from experimental philosophy. His works are filled with a constant polemic against 'hypotheses', by which he usually meant ideas of this character. In the days of his early optical experiments, this polemic takes the mild form of declaring for the postponement of hypotheses till accurate experimental laws are established by a study of the available facts. As a matter of fact, after properties and laws are thus established experimentally, all the proffered hypotheses that cannot
be reconciled with them are at once rejected. Several different hypotheses will be found reconcilable if properly interpreted. But Newton's absorbing interest lay in the properties and experimental laws immediately demonstrable from the facts, and these he insisted on absolutely distinguishing from hypotheses. Newton was quick to take offence whenever his experimentally based 'theories' were labelled 'hypotheses'. For example, when the mathematician Pardies incautiously referred to Newton's theory of colours as a 'very ingenious hypothesis', Newton promptly corrected him. Newton emphasised that there was conclusive experimental evidence that sunlight comprises rays of differing colours and refractive properties. He distinguished carefully his 'theory' that light has certain properties of refraction, from any 'hypothesis' about waves or corpuscles by which these properties might be explained.

Newton defended a similar position on the 'theory' of gravitational attraction. He insisted that he had established the existence of gravitational attraction and its mode of operation, thereby accounting for the motions of the planets, the tides, and diverse other phenomena. But he did not wish to jeopardize this 'theory' by tying it to a particular hypothesis about the underlying cause of the attraction. These principles (mass, gravity, cohesion, etc.), he
considered, not as occult qualities, supposed to result from the specific forms of things, but as general laws of nature, by which the things themselves are formed; their truth appearing to us by phenomena, though their causes be not yet discovered. 21

In order to direct the search for fruitful explanatory hypotheses, Newton suggested four regulative principles, referred to as 'hypotheses' in the first edition of the Principia, and 'rules of reasoning in philosophy', in the second edition. We press importance to the fourth rule of reasoning in philosophy. If that rule is read rightly, we find that, the fourth rule absolves Newton from the charge of accepting in his philosophy certain a priori principles. The fourth rule of reasoning is:

In experimental philosophy we are to look upon propositions collected by general induction from phenomena as accurately or very nearly true, notwithstanding any contrary hypotheses that may be imagined, till such time as other phenomena occur, by which they may either be made more accurate, or liable to exceptions. This rule we must follow, that the argument of induction may not be evaded by hypotheses.

In other words, we have no metaphysical guarantee whatever against there appearing exceptions to even our most confidently adopted principles; empiricism is the ultimate test.
We thus find in Newton's method of enquiry, a combination of the mathematical and experimental methods. Burtt summarises the essence of this combination as follows:

For Newton, then, science was composed of laws stating the mathematical behaviour of nature solely — laws clearly deducible from phenomena and exactly verifiable in phenomena — everything further is to be swept out of science, which thus becomes a body of absolutely certain truth about the doings of the physical world. By his intimate union of the mathematical and experimental methods, Newton believed himself to have indissolubly allied the ideal exactitude of the one with the constant empirical reference of the other. Science is the exact mathematical formulation of the processes of the natural world.22

Hume began to write philosophy three or four years after the death of Sir Isaac Newton. People were still excited at the wonderful discoveries of Newton's science. It is, therefore, not surprising that Newton's science created an impact on Hume's philosophy. Hume, at least, seems to share the general scientific outlook of Newton, that the phenomena (in the Aristotelian sense) are the ultimate court of appeal for every scientific matter, that scientific theories should not go beyond the manifest qualities of things, that our enquiries should proceed from effect to cause, from particular causes to general principles, from less general principles
to more general principles, and so on, and that there can be no a priori or necessary knowledge of Nature. However, these traits of Newton's general scientific outlook are also to be found in Bacon, Locke, Hutcheson, and others, whose names Hume gratefully mentions in his Introduction to the Treatise. In the same place, he says as if Lord Bacon originally initiated the movement of science in England, and natural philosophers were quick to adopt it, but regrettably, the moral philosophers were late by over a century in appreciating the value of science for their subjects.

'Tis no astonishing reflection to consider, that the application of experimental philosophy to moral subjects should come after that to natural at the distance of above a whole century; since we find in fact, that there was about the same interval betwixt the origins of these sciences; and that reckoning from THALES to SOCRATES, the space of time is nearly equal to that betwixt my Lord BACON and some late philosophers in England, who have begun to put the science of man on a new footing, and have engaged the attention, and excited the curiosity of the public (T xvi-xvii).

This passage suggests that Hume inherited the concept of science and of scientific method from Lord Bacon. There are, of course, unmistakable references of Hume's Newtonian ambition in his writings. For example, in the first Enquiry Hume writes:
Astronomers had long contented themselves with proving, from the phenomena, the true motions, order, and magnitude of the heavenly bodies: Till a philosopher, at last, arose, who seems, from the happiest reasoning, to have also determined the laws and forces, by which the revolutions of the planets are governed and directed. The like has been performed with regard to other parts of nature. And there is no reason to despair of equal success in our enquiries concerning the mental powers and economy, if prosecuted with equal capacity and caution (E1 14).

Certainly, Hume wanted to achieve something in the moral sciences which might be compared to Newton's success in astronomy. But it will be superficial to say that he did follow, or attempted to follow, the Newtonian method of enquiry into the moral subject. There are two simple reasons for which the method of Newtonian science could not be applied to Hume's so-called 'science of human nature'. First of all, human nature or moral nature, unlike physical nature, is not subject to quantitative measurement, and, therefore, mathematics could not be applied to it. As we have seen, mathematics plays a very important role in Newton's science. Even if mathematics is not an instrument of discovery, it is at least an indispensable instrument for the calculation and prediction of phenomena in the Newtonian science. But, as Noxon rightly remarks, Hume's Treatise is 'as unmathematical as Ovid's Metamorphoses'. Secondly, experiment for
Newtonian science means 'exact experiment'. Such an experiment can be conducted under controlled conditions. But there is something very evasive in human nature which makes exact experiments on the subject impossible. Strictly speaking, Hume's so-called science of human nature is neither mathematical nor experimental.

In the *Treatise*, Hume says that the purpose of his 'science of Man' is to explain the 'principles of human nature' (*T* xvi). Also, in the first *Enquiry*, he expresses the hope that his science will discover, 'at least in some degree, the secret springs and principles, by which the human mind is actuated in its operations' (*E* 11 14). The method, he proposes in the *Treatise*, and also in the *Enquiries*, is the 'experimental method', and this involves the performance of 'careful' and exact experiments (*T* xvii), and the deduction of general maxims from a comparison of particular instances. This method is different from the 'other scientific method, where a general abstract principle is first established, and is afterwards branched out into a variety of inferences and conclusions' (*E* 11 174). Hypotheses play no part in the 'science of Man'.

Hume spoke highly of the importance of experiments in the study of human nature.
For to me it seems evident, that the essence of the mind being equally unknown to us with that of external bodies, it must be equally impossible to form any notion of its powers and qualities otherwise than from careful and exact experiments, and the observation of those particular effects, which result from its different circumstances and situation (T xvii).

Experiment is observation under controlled conditions.

When I am at a loss to know the effects of one body upon another in any situation, I need only put them in that situation, and observe what results from it (T xix).

But moral philosophy has 'this peculiar disadvantage, which is not found in natural, that in collecting its experiments, it cannot make them purposely, with premeditation' (T xviii-xix). 'We must therefore glean up our experiments in this science from a cautious observation of human life, and take them as they appear in the common course of the world, by men's behaviour in company, in affairs, and in their pleasures' (T xix), concludes Hume.

In all these what Hume says is that experiment on human nature is the deliberate consulting of experience under a variety of circumstances in which the phenomenon under investigation may be made to appear. I may directly consult my own experience. But if there is a difficulty in the
matter, I shall have to infer the contents of experience in others' mind from their behaviour in various situations. In many places of his work, Hume asks us to consult our own experience to verify the truth of his contention. However, if 'experimental' is thus used as a synonym for 'experiential', then it hardly conforms to the usage of Newton and the tradition.

Hume sometimes performs an exercise which he thinks of as conducting an experiment.

When we press one eye with a finger, we immediately perceive all the objects to become double .... But as we do not attribute a continu'd existence to both these perceptions, and as they are both of the same nature, we clearly perceive, that all our perceptions are dependent on our organs, and the disposition of our nerves and animal spirits (T 210-11).

But it is really no experiment of the scientific kind in which the experimenter is eager to know the result of his experiment. It is a common experience and Hume is referring to it to illustrate his point of view.

In the second Section of Part II, Book II of the Treatise, Hume devises eight 'Experiments to confirm this system'. All of his eight experiments are thought experiments, as observed by James Noxon. They are elaborations of a point of
view, and the events that are supposed to illustrate a hypothesis are logically possible events and not actual events.

The sub-title of the Treatise creates an apparent impression that it is an experimental work. But the sub-title appears to be somewhat misleading. Nowhere in Hume's works, we find any accounts of 'careful and exact experiments', or of 'cautious observation' of men's behaviour in company etc. There are observations of human behaviour, but they are not accounts of a particular man's behaviour in carefully specified circumstances. They are accounts of certain general features of human behaviour which are in fact obvious to everybody. Hume did not, and possibly could not, conduct experimental researches on the moral subject. 'Exact experiment', as we have seen, bears a special significance in the tradition of science to which Newton belongs. Science, for Galileo and Newton, is 'exact science'. Galileo had declared that science or exact science is not possible in laws and humanities as they are dependent on human judgment. In the tradition of exact science, Nature is subjected to a special kind of reduction; it is mathematical nature composed of primary qualities only to which man does not belong. 'Exact experiment', which involves precise calculation and exact verification, is possible only in this mathematically determined nature. On the other hand, Nature, as Hume saw
it, draws reference to Man. 'Indulge your passion for sci-
ence, says she, but let your science be human, and such as
may have a direct reference to action and society' (E1 9).

The Galilean-Newtonian science banished Man from Nature,
but Newton made provisions for God. Hume, on the other hand,
wrote philosophy to reinstate Man in place of God. He wanted
to show that 'all the sciences have a relation, greater or
less, to human nature' (T xv); that it is the 'capital or
centre of these sciences'. Thus Hume made a move in a diame-
trically opposite direction to that of Galileo and Newton.
Of course, Hume shares with them the basic attitude of science.
It is the attitude that nothing is entertained in science
for which no evidences of experience are available. The
general principles of human nature, Hume claims, are estab-
lished by way of inductive generalisations from particular
facts of experience. However, the facts that come up for
consideration in Hume's 'science of Man' are not simple
facts. They, too, have been subjected to a special kind of
reduction — the reduction to the frame-work of mind. What
Hume apparently failed to observe is that a mentally reduced
nature is not amenable to scientific treatment. Thus it is
no wonder that his principles of human nature are not deri-
ved from 'careful and exact experiments' or from 'comparison
of particular instances' i.e. inductions. For example, the
'first principle in the science of human nature'. It is the
principle that 'all simple ideas proceed either mediately or immediately from their corresponding impressions' (TI i 1). Hume offered certain arguments to prove that the principle is an empirical proposition. But the use he makes of it shows that for him an idea is by definition a copy of an impression. That means, the principle is a logical principle. Conceived as an empirical principle, it is defective. Commenting on the nature of the copy principle, Antony Flew writes:

It is like announcing that all Jews are good business men, supporting this generalization with some more or less relevant evidence, and then dismissing any suggested falsifying counter example on the grounds that, no matter what the appearances to the contrary, the person in question cannot really be a Jew: because, notoriously, all Jews are good business men; which he is not.26

But really the copy principle is not that defective, for despite what Hume says about it, the principle is a logical principle, and not an empirical generalisation. It has been widely noticed that Hume followed Newton in banning hypotheses from his 'science of Man'. Newton raised the slogan 'hypotheses non-fingo'. At the same time, he made ample use of hypotheses in this scientific works. Similarly, Hume publicly spoke against hypotheses, and yet, he made plentiful use of them. He referred to his theory of belief in the Treatise as a 'new hypothesis' (T 112). His explanation of pride and humility in terms of association is frankly presented as a hypothesis (T 289-290). Again, his explana-
tion of the love of fame on the basis of the sympathy principle is acknowledged to be a 'hypothesis' (T 324). Nevertheless, Hume thinks, he 'talks with contempt of hypothesis' in the Treatise (A 646). In the Introduction to the Treatise, he says that 'any hypothesis, that pretends to discover the ultimate original qualities of human nature, ought at first to be rejected as presumptuous and chimerical' (T xvii).

So far both Newton and Hume seem to be inconsistent. However, this inconsistency is not of a serious nature, since the term 'hypothesis' has been used by them in different senses under different circumstances. When Hume condemned hypothesis, he meant only conjectures. They are also called by him 'extravagant hypothesis'. An extravagant hypothesis is not empirically testable. It is not confirmed by observation or experiment. However, Hume accepted a hypothesis when he used it as principle or general principle, doctrine, system etc. A principle or a doctrine is clearly manifest in experience and is free from doubt. For example, 'the association of ideas', according to Hume, is a clear principle and is thus resolved into original qualities of human nature. An enquiry into the cause of this 'association' would lead us into uncertain speculation and inadmissible hypothesis. Similarly, men's fellow feelings with others is a clear principle in human nature. But a search for its cause would be a
conjecture or a hypothesis, for that could not be tested by observation or experiment. Here Hume is using the term 'principle' in the same vein in which Newton used it.

Both Newton and Hume stress the distinction between empirically confirmed principles and theoretical explanations of them which take the form of hypotheses in the conjectural sense. Newton insisted that his experimentally established conclusions about the composition of white light were independent of any hypothesis. Again, he presented his theory of universal attraction as an empirically established principle; its consequences were deduced mathematically and were observed to be manifestly present in phenomena. His speculations about the cause of gravity, on the other hand, were hypothetical, since no experiments were forthcoming to determine them.

Hume, to be sure, endorsed Newton's strictures upon hypothesis, but for different reasons. Newton imposed a ban on hypotheses as he got involved in squables about the nature and validity of his principles. It appeared to Newton that his critics did not follow the distinction between an explanatory proposition and an experimentally verified principle. The same phenomenon may be explained in so many ways. But Nature, as Galileo said, does not say the same thing in so many ways. Newton did not believe that his theory of the
composition of light or his theory of gravitation, for example, is one explanation among other possible explanations of the phenomena under investigation. Thus in refusing the title 'hypothesis' for his principles, Newton, in effect, committed himself to defending the Galilean view that science gives us a true description of the world. Hume, on the other hand, prescribed a ban on hypotheses with a view to setting up a valid limit to scientific enquiry. Not any and every question is permitted to raise within the scope of science. The question of the 'ultimate' is one such question. Science is strictly confined to experience. In experience there is always something which is originally given. Science cannot ask about the cause of that which is originally given. They must be accepted and not questioned. Hume's 'science of Man' thus commends us to accept a large collection of ultimates. As N.K. Smith observes:

All impressions of sensation, and as regards impressions of reflexion, the various appetites and passions moral and aesthetic, approvals and disapprovals, custom as an agency capable of generating a quite new feeling, the propensity in the mind to spread itself over external objects, these—with sympathy in the moral sphere and belief in the theoretical sphere standing ready to yield support to one and all of them—are the sort of factors which Hume was prepared to regard as ultimate, and to which he freely resorted in circumventing the obstacles that beset his path. 27
It is doubtful if Newton himself would allow a limit to scientific enquiry by regarding certain qualities as 'ultimate'. Even he thought that to discourse of God from phenomena belongs to experimental philosophy. But from Hume's point of view this is a gross violation of scientific practice. Hume's strictures upon hypotheses are specially applied to such discourses.

In the light of what we have discussed so far, Hume's claim to experimental science seems to be rather extravagant. This is not however to deny the glory of his works. His Treatise is, by universal consent, a philosophical masterpiece. Philosophy, as A.J. Ayer points out, is distinguished from other sciences and arts by its methods rather than its subject-matter. It will not be too much to say that Hume had a distinguished philosophical mind, and the methods that he used in his philosophical enquiries are distinctly philosophical.

Sometimes the methods that the philosopher follows is determined by his conception of the problem. The problem with which Hume seems to be concerned all through is the problem of foundation of all human knowledge. Philosophers before Hume conceived of it as an abstruse metaphysical problem. They, therefore, used speculation as a method for solving the problem. But, for Hume, it was the problem of
human understanding. It is the mind that understands. Mind is variously capable of knowing, believing, feigning, and so on. Sometimes we wrongly suppose that we know while we just feign. Many philosophical errors owe their origin to such confusions. Thus one of the important tasks of the philosopher is to clearly distinguish between different parts and powers of the mind. The business of a philosopher in this respect is, what Hume in the first Enquiry says, to provide the 'mental geography' (E1 13). But that is not enough. Philosophical searches may go deeper, and may finally discover the secret 'springs and principles, by which the human mind is actuated in its operations' (E1 14). The philosopher's task, in this regard, is comparable to the task of an astronomer. In order to provide either the 'geography of mind' or the 'astronomy of mind', the philosopher must enter most intimately into his own mind and see the things for himself. This is possible through reflection and meditation. Hume's is a reflective and meditative enquiry all through. Besides reflection, Hume also employed logical analysis of concepts and analogical apperceptions. Reflection, analysis and apperception — all these are peculiarly philosophical methods, and Hume made most use of them.

Hume's works abound in reflections, though he hardly ever clarified the meaning of philosophical reflection used as method. At the same time, he used the word 'reflexion', in
various senses. The reflection that produces impressions of a new kind ('impressions of reflexion') is the other name of contemplation. Again, the reflection that is said to attribute 'self-identity' to the distinct perceptions entering into the composition of the mind is an unconscious reflection. Moreover, Hume frequently used the word 'reflexion' in the sense of argument. But when he says,

> For my part, when I enter most intimately into what I call myself, I always stumble on some particular perception or other.... (T 252)

he is in a reflective and meditative mood. Again, when in the Introduction to the Treatise, Hume points out the difficulties of collecting experiment in the sphere of mind,

> But should I endeavour to clear up after the same manner any doubt in moral philosophy, by placing myself in the same case with that which I consider, 'tis evident this reflection and premeditation would so disturb the operation of my natural principles, as must render it impossible to form any just conclusion from the phaenomenon (T xix),

he, in effect, points out the difficulties of reflection. To obviate the difficulties of self-reflection he wants to carry on experiments on others 'in company, in affairs, and in their pleasures' (T xix).
It has been pointed out by many scholars that Hume never conducted experiment on others. But he consulted others' experience through a different kind of perception, that is, analogical apperception. Analogical apperception consists in observing others' behaviours and getting to know their experience in terms of one's own experience under similar circumstances. Here self-reflection follows upon others' behaviour.

Descartes set philosophy in the habit of raising the question 'what are we aware of?'. In order to find answer to this question, he asked the philosopher to turn his attention inwards and examine the objects of his consciousness. Hume, more than Descartes himself, conducted his philosophical enquiries into what we are aware of in all that we seem to know or understand. For this purpose he used philosophic reflection, though in giving account of it he used the label 'experiment' for self-reflection. As a matter of course, mind is concerned with the object outside. But reflection inwards the mind, whereby the object of experience is reduced to the experience of the object. That means, reflection provides us with second-order knowledge, i.e. knowledge of the knowledge of objects. Walsh rightly points out that epistemology is concerned with second-order knowledge. Hume's theory of understanding, which culminates in a theory of mind, is one kind of epistemological enquiry, and it is reflection that helps him produce this epistemology.
Hume used reflection as a method of philosophising. Besides reflection, he also used analysis in good measure. In fact, he is the pioneer in modern trends in analytic philosophy. Hume's philosophical analysis, however, invariably terminates in reflection. For Hume, analysis is a method of clearing away the confusion of concepts and reflection is a method of discovering the meaning of concepts. Through analysis he tracks down the elementary ideas involved in a complex idea, and for determining whether a particular idea is a real idea for a so-called idea, he enters into his mind to see what lies inside. The twin method of analysis and reflection is hinted at when Hume at the end of Book I, Part I, Section II of the Treatise says:

And as the impressions of reflexion, viz. passions, desires, and emotions, which principally deserve our attention, arise mostly from ideas, 'twill be necessary to reverse that method, which at first sight seems most natural; and in order to explain the nature and principles of the human mind, give a particular account of ideas, before we proceed to impressions. For this reason I have here chosen to begin with ideas.

In this kind of enquiry, analysis precedes reflection.

Philosophical analysis, or for that matter, every kind of analysis requires general principles. As we have already pointed out, Hume presented his 'first principle.... in the
science of human nature' as a logical principle for conveniently carrying out analyses. James Noxon's observations may be noted in this regard:

The copy principle is a rule of procedure. It prescribes a technique for investigating terms which are suspected of not having the meanings imputed to them in philosophical theories. It is a methodological instrument devised for semantic analysis. It is, as Hume says, a 'maxim', which means, in one acceptable sense of the term, 'a general principle serving as a rule or guide' — in this case, a rule or guide for testing terms by attempting to locate their referents amongst experienced ideas.

Hume made two types of analysis, which have been adopted later, in one form or other, by the logical positivists and the linguistic analysts of our time. He sought to remove philosophical disputes regarding the 'nature and reality' of ideas by clarifying them with reference to experientially determinable impressions. In Hume's own words:

When we entertain, therefore, any suspicion that a philosophical term is employed without any meaning or idea (as is but too frequent), we need but enquire, from what impression is that supposed idea derived? (E 22).

Again, Hume proposed to resolve philosophical controversies, like that concerning freedom of will, which are still undecided
owing to some ambiguous expressions 'which keep the antago-
nists still at a distance, and hinder them from grappling
with each other' (E1 81), by a few 'intelligible', 'exact'
and 'juster definitions'.

As a method, analysis has its limited value for a philo-
sophical system. It is mainly useful as, what the linguistic
philosophers regard, a therapy for morbid philosophical mal-
dies. Analysis removes some of the difficulties of philosophy,
but solves no problem in it, and 'problem', as Hume points
out, is different from 'difficulty'. Problems are to be solved,
rather than dissolved. In so far as unclarity of ordinary
linguistic expressions and confused ideas created difficulties,
Hume resorted to analysis to remove them. But, for a system-
builder like Hume, clarity was not enough. He wanted to remove
'false' and 'abstruse metaphysics' only to make room for,
what he regarded as, 'true metaphysics' based on a critical
examination of the powers and faculties of the human mind,
i.e. on a mental geography. Analysis, then, in the Humean
system prepares the ground, which is, thereafter, cultivated
by other more fruitful philosophical methods.

We have already discussed that Hume resorted to reflec-
tion and meditation as means of studying the contents and
workings of the mind. In the beginning of the century, this
method came to be specified as the phenomenological method.
However, Hume was no dogmatist. His greatness lies not in dogmatically sticking to one method, but in simultaneously practising — sometimes even contrary to avowed methodological professions — many different methods according as the subject-matter demands. Hume even followed, what came to be later treated by Kant as, the transcendental method of enquiry. For Kant, anything is transcendental which is concerned with the a priori conditions for the possibility of knowledge. Again, to be a priori is to be in the mind — this is the Kantian line of argument. To be sure, Hume followed this line of argument in determining some of the original qualities of human nature or human mind. For example, Hume observed that our ideas get associated in the mind according to certain general patterns. And yet, 'all our distinct perceptions are distinct existences', and 'the mind never perceives any real connexion among distinct existences' (T 636). Associative qualities, therefore, 'must be resolv'd into original qualities of human nature'. Hume, it appears, followed similar line of arguments in resolving our unconditioned belief in the existence of the world outside, our general belief in universal causality, into fundamental natural beliefs inherent in human nature. However, Hume was not very much sure about the nature of the transcendental arguments, and in many places he mistakenly regarded them as inductive arguments. But, actually, inductive arguments are different from transcendental arguments (in the
sense specified by Kant). In an induction we start from facts of experience and pass on to a generalisation about those facts. But in a transcendental argument we start from experience of facts and pass on to the mind as the a priori condition for the possibility of that experience. One of the primary objectives of Hume's 'science of Man' was to ascertain the powers and faculties of the human mind, and, for that purpose, to a great extent, he followed transcendental arguments along with other methods of enquiry.

A few words on Hume's 'accurate and just reasoning' will conclude this part of our discussion. Hume prescribed two types of arguments — arguments concerning relations of ideas (mathematical reasoning) and arguments concerning matters of facts and existence. He even asked his readers to cast any treatise not containing either of those two types of reasonings to flames. But there is no denying that Hume wrote philosophy. Philosophical arguments, as A.J.Ayer points out, are different from arguments employed in other arts or sciences. They do not normally consist in formal demonstration or in factual verification. Philosophical arguments are of various kinds, some of which are deductive arguments. Hume would like to dismiss those deductive arguments as 'imperfect definitions' (E1 163). But some of Hume's best arguments in the Treatise and also in the Enquiry are deductive arguments. If those arguments are to be cast into the flames as 'sophistry and illusion', much of the force of the Treatise and the Enquiry will be destroyed with them.