CHAPTER III

THE ANALYTIC JUSTIFICATION OF INDUCTION

Various attempts have been made for a solution of the problem of justification of Induction. We can consider the problem of justifying induction as a genuine problem, and can seek a satisfactory formulation of the problem and may inquire whether a satisfactory explanation of the validity of induction is possible.

Mainly three types of justification of induction have been provided during the recent years, namely, Analytic justification, Pragmatic justification and Inductive justification.

A few modern writers like Paul Edwards, P. F. Strawson, S. F. Barker, Nelson Goodman and others are proponents of the analytic justification of induction. According to them the principle of induction is itself analytic. By an analytic justification they understand that calling an inductive inference correct is analytically true. Richard Swinburne explains analytic justification of induction as follows:

"When we subsequently call other inductive inferences correct and other beliefs rational, what we are doing is saying that they are like the standard example. Similarly for example, we come to learn what "green" means by being shown standard examples of green objects - grass, leaves in spring, runner beans, etc. When thereafter we describe other objects as green what we are saying is that they are like the standard example. Because of this it makes no sense to question whether the standard green objects really are green. Similarly we cannot sensibly question whether the examples of purportedly correct inductive inference by which we have been taught the meaning of correct inductive inference really are correct".[1]

Paul Edwards gives an analytic justification of induction. He explains it by an example. Suppose we observe _n_ cases of crows and all of them are black then we will predict that _n_+^{1st} instance of crow which we might observe will be black. He argues that to accept the conclusion of this evidence is reasonable. But here the problem is whether it is good reason to accept this conclusion. Paul Edwards tries to give an answer by pointing out that we have an observation on _n_ positive instances of a phenomenon in various circumstances and found no negative instance of it; that "without in any way invoking a non-empirical principle, number of positive instances do frequently afford us evidence that unobserved instances of the same phenomenon are also positive".[2]

Edwards believes that there is a philosophical puzzle in the problem of induction and this can be dissolved. According to him this puzzle creates in fact a problem of induction; and if the puzzle is dissolved; then the problem is solved. He tries to explain this puzzle by examples like the following:

(A) - "There are hundreds of physicians in Lucknow". A physician is a person who has obtained a medical degree from a recognized institution and can cure diseases more effectively than a layman.

(B) - "There are no physicians in Lucknow". Here the term physicians is used in a different way, meaning a person who has a medical degree and can cure diseases in less than two minutes.

Here B is not really a contradictory statement, because the word "physician" has different meanings in A and B. Paul Edwards says that in the statement B `Fallacy of Ignoratio Elenchi' has been committed, because in it the expression "physician" has been redefined and used in a sense which is different from its ordinary sense.

When `physician' is taken in its normal sense there is no problem when it is said that there are hundreds of physicians in Lucknow. But when the word `physician' is redefined to convey an extraordinary sense, there is a problem for those who have not understood that sense when they are told that there are no physicians in Lucknow. Similarly when from sufficient number of positive instances of something we infer the nature of the next instance, there is no problem of induction ordinarily. But as soon as logically conclusive evidence is expected from inductive inference, the problem of induction arises.

Paul Edwards maintains that for the removal of this fallàcy of Ignoratio Elenchi we should use the argument from standard example. He states that if we have $\underline{n}$ positive instances and no negative instance of the phenomenon then we have a good reason to believe that $\underline{n}+^{1st}$ instance will be positive.

According to Hume $\underline{n}$ positive instances in experience creates an expectation to believe that $\underline{n}+^{1st}$ instance will be positive too. Our expectation cannot prove the $\underline{n}+^{1st}$ to be positive. Hence it is not a good reason according to Hume. He means by a reason a logically conclusive reason and by evidence a deductive conclusive evidence.

Paul Edwards argues that the term `reason' should be used in its normal or ordinary sense, because if reason is used in any extraordinary sense then it might have to be admitted that the past observations can never by themselves be a reason for any prediction whatsoever. But people claim to have reason for predictions in science and ordinary life, on the basis of normal use of the word `reason'.

J. O. Urmson says that if we examine the thesis of Paul Edwards, we find that he has not solved the problem; some residual problems remain which have not been solved. Urmson argues that some descriptive terms like `solidity' can be described by standard example. But if by the help of standard examples we try to describe evaluative terms like `good', `correct', `reason' etc., then we cannot succeed. These terms have residual evaluative meanings. According to Urmson we can describe a good table, a good chair, etc. but we cannot fully describe what good is, because there is a residual emotive meaning. For evaluation of something there are some rules. But still the problem remains as to why we use these rules to prove the standard example. Urmson believes that the problem of induction cannot be resolved totally, for some residual problem always remains.

P. F. Strawson's thoughts on the problem of justifying induction are similar to Paul Edwards. According to him inductive arguments are not deductively valid. Inductive reasoning must be assessed for soundness by inductive standards. The justification of induction consists merely in giving particular reason for particular induction in conformity with inductive standard.

Strawson argues that the demand for the justification of induction is wrong. Some philosophers have attempted to justify induction by searching the supreme premiss of induction for proving induction as deduction.

Strawson maintains that to prove an inductive argument as a deductive argument, we use the law of the Uniformity of Nature. For example, take the argument: the kettle is on fire for 10 minutes; therefore the kettle must be boiling. We can substitute a deductive argument by introducing a generalization, `all kettles when heated for 10 minutes boil' as an additional premiss.

Strawson claims that the principle of the Uniformity of Nature is a search for that supressed principle for all inductive argument, which whenever supplied will change inductive arguments into deductive arguments. For example, if <u>n</u> cases of <u>f.g</u> are observed and no <u>f.~g</u> are observed, then the next <u>f</u> will be <u>g</u>. Here the general problem for stating the principle of Uniformity of Nature is that, instead of <u>n</u> if we used a finite number then it might be that the next instance after that numerical value may not turn out to be the same.

If the argument is empirical the charge of circularity will again arise because we are trying to prove it by the principle of the Uniformity of Nature, and again we need an empirical argument to prove this principle, appealing to empirical evidence.

Strawson, like Paul Edwards argues for the validity of the inductive procedure in the following way: All cases of f are g; No case of f which is non-g has been found; on the basis of these premisses, it is rational or reasonable to accept that the next f will be g. According to him there is no other way of justifying that the next f will g because it is an analytic statement. He believes that induction is a rational process.

Strawson maintains that every successful method has an inductive support for finding out about the unobserved. Successful method means that it has been repeatedly applied with success. He asserts, "Any successful method of finding out about the unobserved is necessarily justified by induction. This is an analytic proposition".[3]

According to Strawson when we are asking for justification of induction we are using the term `justification' beyond its limit. The terms `valid' and'invalid' can be applied to deductive argument but not to deduction itself. In the same way we can prove an inductive argument correct or incorrect but not induction as such.

"It is an analytic proposition", says Strawson, "that it is reasonable to have a degree of belief in a statement which is proportional to the strength of evidence in its favour".[4] According to him, "we can never describe the strength of the evidence more exactly than by the use of such words as `slender', `good',`conclusive'".[5] He believes, it is possible to answer the question `Will induction continue to be successful ?' because we have good evidence for this, but `induction is reasonable' is simply analytic. Strawson argues that there is no way of justifying induction in general, although there are ways of justifying particular inductions. He regards the problem of finding a general justification of Induction unreal.

A variant view is suggested by S. F. Barker. According to him, "We do not know with certainty that people who practice induction will be more successful in reaching true conclusions than will those who practice some form of anti-Induction; but what we do know with certainty is that those who practice induction will probably be more successful - that is, that it is reasonable to believe that they will be more successful". This is a justification of induction by way of dissolving the problem because "just as it is inconceivable that <u>modus ponens</u> should be unreliable, so it is inconceivable that inductive inference should not probably be the most successful kind in the long run". Barker says, "Already built into the normal sense of the word `rational', a rational man is necessarily one who among other things, reasons inductively rather than anti-inductively".[6]

Therefore to justify induction by way of dissolving the problem, is to recognize that the conclusions of the general practice of induction are `probable' and `rational' by our use of the words `probable', `inductive practice' and `rational'.

According to Barker induction is justified because it is rational. He holds that there is an analytic relation between induction and rationality through probability. He uses the word `probablity' in the sense of relative frequency.

W. C. Salmon asks why we should prefer probable conclusion to improbable ones. Why should we believe probable conclusion ? Barker replies that these questions arise from conceptual confusion. According to him in arguing that a conclusion is probable, one is not only describing it, but is taking a stand in favour of believing it. For example, to say that a girl is beautiful is to take a stand in favour of admiring her. Thus it is self-contradictory to deny that probable conclusions are to be preferred.

This line of thinking confines justification of induction only to that of known or accepted standard examples, without considering the problem of justifying inductive conclusion which are not yet known as standard. We must try to find out what constitutes a standard examples of a standard rule of practice which make it acceptable or trustworthy. For example, we want to know what explanation we can give to the use of the words 'probable' or 'rational' in the statement that it is probable that all crows of India are black and it is rational to believe that the sun will rise tomorrow.

Inductive standard rules and individual inductive conclusions are subject to continual modification and reformulation in the light of empirical findings or in the light of theoretical consideration. These standards must be checked against what we find and formulate in the process of empirical inquiry.

The first explicit statement that the principle of induction is analytic is given by Asher Moore. According to him the relation between past facts and the probablity of future fact is analytic. He says that "it is more probable that uniformities either universal or statistical which have been observed to hold uniformly in the past experience, will continue to hold uniformly in the future".[7]

Asher Moore claims that here the word 'probable' does not carry any commitment concerning future frequencies. He says that we are used too to regard a probability statement as being predictive. He is trying to show that probability statements are really non-predictive. They are analytically derivable from a statement describing past facts and are alternative ways of describing certain characteristics of those facts.

He writes, "any predictive statement, which says that a certain event `a' will have a certain charateristic ϕ, I shall call this statment sometimes P, sometimes when I want to distinguish its component ϕd, what does it mean to say that on certain data, P has a probability of, say a/b ?"[8]

He says that in the above example all that is asserted in addition to the data of probability is the empirical contents which are analytically derivable from those data by rules of evidence. It does not predict anything and hence no future experience can be relevant to its truth.

Here the question may arise: How do we know which rules of evidence will give us a correct probability judgement ? Moore gives an answer by saying that on the basis of the totality of past experience a frequency estimate is highly probable. Huge number of past experiences have uniformly shown this frequency. He argues that the statement `P is probable' says that past experience supports P or makes it reasonable to believe it in some degree.

Miss May Brodbeck refutes Moore's analytic approach to the problem of induction. She says that there is no basis on which we can construct the inductive logic. She questions the basis for preferring large samples to small ones, highly varied ones to homogeneous ones. According to her all such preferences are based on induction. She maintains that the real problem of justification is that we have observed uniformity in the past, and this analytically implies that it is reasonable to expect uniformity in the future. She claims that *"if there is any* problem of induction, it is about the relationship between observed and unobserved".[9]

According to Asher Moore the *principle of induction is* analytically true and there is no need for any mataphysical postulate of uniformity of nature. If the principle of induction is expressed in terms of probable continuance of uniformities then it is a non-factual statement and could not possibly be a metaphysical assertion about nature. He believes that the rules of induction cannot be justified by induction. Rules of induction are not empirical statements. He says that "the rules of induction concerning mixing large samples, varied data and so on, constitute the full expansion of the principle of induction ".[10] Moore holds that it is reasonable to believe that past uniformities will continue because it has always been so.

May Brodbeck criticizes Moore's view. According to her the problem of induction is precisely the problem of justification for saying more than what has been observed (in the above example) for asserting P itself. She says that justification `on data D, P is probable' has nothing to do with what is meant by the problem of induction. Actually for justifying P (where P is predictive statement) the whole statement `on date D, P is probable' does not say anything about P itself and therefore fails to justify P.

C. I. Lewis also supports an analytic justification of induction. He develops his views by refuting two assumptions which have been made by Humean sceptics against the validity of empirical generalization. It is assumed by Hume that there is no necessary connection of ideas in our empirical knowledge. For this reason he maintains that empirical knowledge has no rational basis. Secondly he assumes that if there were a rational basis for empirical generalization it should be certain, so that on the basis of it we could infer empirical generalization from given data as in deductive inference.

Lewis argues that the first assumption is false and second does not prove the invalidity of empirical generalization. In connection with the statement that there is no necessary connection of ideas in our empirical knowledge, Lewis observes that the Humean sceptic fails to notice "the ways in which the necessary connection of ideas are pertinent to the interpretation of the empirically given and hence are antecedent determination of reality".[11]

He argues that necessary connection of ideas are relations between concepts. They are determined by means of logical laws and decisions regarding the meaning of concepts. He claims that irregularity of a true empirical generalization does not effect the validity of empirical generalizations. According to him *empirical generalizations are never certain* but merely probable in a certain sense. He wants to say that we can justify induction and empirical generalization from an apriori analytical point of view.

Lewis gives a general principle which he thinks is essential and fundamental for the justification of induction and calls it principle A. The principle is "It must be false that every identifiable entity in experience is equally associated with every other".[12]

By this principle we can always apply concepts to experience and there must be apprehensible things and objective facts. He draws a distinction between various concepts of sense experience like colour, sound, taste, etc. and various concepts like chair, table, etc or concepts of theoretical objects like atom, electron, etc. A concept of pink colour applies to patch of pink colour or a concept of a table applies to a particular table.

Lewis says that to justify induction and empirical generalization on the basis of principle A is to recognize the indispensability of inductive procedure for pursuing knowledge of reality. He argues that whosoever continuously revises his judgement of the probability of a statistical generalization by its successfully observed verification and failure cannot fail to make more successful prediction. But it seems difficult to believe because the self correcting nature of induction does not guarantee that action or prediction, in accordance with empirical generalizations based on what we have already known, will be more successful than action or prediction not in accordance with them.

Lewis's thesis for apriori analytical justification of induction can be explained by the following argument.

> If something exists then we can make some true empirical generalizations.
>
> Something exists.
>
> Therefore we can make some empirical generalization.

He considers that the premisses of this are necessarily true. Here the first premiss is necessarily true because it is a part of Lewis definition of existence of things or his theory of reality. He asserts that this theory of reality consists of apprehensible and objective facts or simply ordered sequence of possible experiences predictable by empirical generalization.

Second premiss is also necessarily true because it is necessary that something exists. According to him we cannot conceive that nothing exists. To say that we cannot conceive that nothing exists is to say that it is inconceivable that we cannot apply concepts to experience. He asserts that if we can always apply concepts to experiences, we shall say that something of which these concepts are true, exists.

Lewis also believes that induction and empirical generalization are indispensible for each other and are presupposed in our knowledge of reality. But here Lewis fails to realize that this is itself no proper ground for the trustworthiness of induction. Lewis tries to give an answer to this question. According to him induction is certainly a ground for the trustworthiness and it is also practically valuable because by the help of it we successfully predict. He maintains that induction is valid because we can always apply concepts to experience and ascertain the uniformities in the world by knowing the results of application of concepts to experience.

Here the problem may arise that if we accept that this argument for general validity of an induction and empirical generalization is valid, then it is still too general because it does not show how we can give reason for the trustworthiness of any particular empirical generalization. It is also not clear how the entailment holds. Applying concepts to experience is one thing and making empirical generalization is quite another. Sometimes the application of concepts may be correct, sometimes not. How does it follow from this that we can make true empirical generalization ?

W. C. Salmon refutes the analytic approach to the problem. According to analytic thinkers, to have reasonable belief is to have belief that are well grounded by justifiable method. According to Salmon to attempt to justify inductive method by showing that they lead to reasonable belief is a failure. If we assume that inductive beliefs are rational in the sense of being based on justifiable method of inference, then we are begging the question. If we regard belief as reasonable because they are arrived at inductively, we have the problem of showing that reasonable beliefs are valuable. According to Salmon it seems that we use inductive method not only because they help us to make correct prediction or arrive at true conclusions but simply because we like to use them.

Another problem regarding the term `reasonable' is that to call something `reasonable' or `rational' means that it is agreeable to certain specific standard. This is disputed. When specific standards are present, we do not say that the argument is reasonable or rational, rather that it is a conclusive demonstration; for example, formal proof of a mathematical theorem. In many other cases there are no specific standards.

Nelson Goodman accepts that though the problem of justifying induction could not be solved, it could nevertheless be dissolved. The dissolution of the problem of justifying induction consists not in proving why an empirical generalization must be true and inductive inference must be valid, but it consists in displaying the meaning of the statement that an empirical generalization is true and the statement that an inductive inference is valid.

He believes that like valid deductive inference, correct inductive inference also presupposes valid inductive rules or principles. The main question for the justification of induction lies in formulating correct or valid rules as well as justifying them on the basis of induction.

It may be asked as to how we can justify formulation of rules as correct or valid. Goodman says that if it does actually propound a rule used in accepted inductive inference, it is valid; if it does not then it is invalid and therfore will be rejected. According to him there is no other problem of justifying induction besides this.

According to Goodman there is always a possiblity of justifying induction because there is always a possiblity of raising doubts against the validity of induction either in the light of new instances or new rules of induction. We may always ask how induction is valid in relation to a given probability or in relation to a given interpretation of knowledge of reality. It shows that a new examination of the problem of justifying induction can always be attempted.

Goodman argues that predictions are justified if they satisfy valid laws of induction, and valid laws of induction are valid if they accurately codify the accepted inductive practices. According to him the problem of induction is a problem of defining the difference between valid and invalid prediction.

He assumes that for the confirmation of a hypothesis we should distinguish law-like statement from accidental statement. In his writings "Fact, Fiction and Forecast" he formulates a problem of the justification of induction in a striking puzzle which he calls `New riddle of Induction'. In this riddle he considers the following case.

Suppose we have observed a large number of emeralds from vast varieties of experience and found all of them to be green then it would be natural to accept on the basis of this evidence a probable generalization that all emeralds are green. He defines a new predicate `grue' which is some how a mixture of green and blue. An object is held to be `grue', if it is green as observed before 2000 A.D. and as observed after 2000 A.D. is blue. Hence all emeralds which we have observed so far have been `grue'. Therefore if all arguments of the enumerative pattern are correct inductive inference, we can conclude that all emeralds are `grue'.

Goodman argues that "all emeralds subsequently examined will be green and the prediction that all will be grue are alike confirmed by evidence statement describing the same observation. But if an emerald subsequently examined is grue, it is blue and hence not green. Thus although we are well aware which of the two incompatible prediction is genuinely confirmed, they are equally well confirmed according to our present definition".[13]

Goodman introduces the new term `grue' in terms of the familiar colour green and blue in the following way; A certain thing X is said to be `grue' at a certain time T if and only if X is green at time T , that is, before the year 2000, and X is blue at time T, that is, after the year 2000.

Here the problem may arise that if we see a green grasshopper today, then on the basis of the above definition we can very well say that we have seen a grue grasshooper today, because to-day is before 2000 A.D. But if we see a green grasshopper after the 2000 A.D. then it would be wrong to maintain that a grue grasshopper had been seen because after the year 2000 some thing is grue if and only if it is blue.

We may say that every time an emerald has been observed as green, we can predict that emerald will remain green. On the other hand if we project the improbable regularity that every time an emerald has been observed it has been grue, then we can predict that emerald will change from green to blue. There is a paradox in combining these two predictions. An acceptable scientific inductive logic must have a rule for determining the projectability of regularities. The problem of formulating exact rules for determining projectablility is the `New riddle of induction'.

S. F. Barker argues that there is a difference between predicate `green' and `grue'. By direct observation we can verify that a thing is green but we cannot now conclusively verify that a thing is grue because for determining the predicate grue we would need to determine whether the date is before or after the year 2000 A.D.

What is the relation between traditional problem of induction and Goodman's new riddle of induction ? For Goodman there is only the problem of characterizing the hypothesis by an evidence-set or problem of systematically determining which projection from an evidence-set constitute valid induction. He interprets the problem as that of explicating the concept of law-like statement and valid induction. Therefore according to Goodman the difference between the old problem and new riddle of induction is that the new problem is a problem of explication which certainly requires empirical knowledge; on the other hand the old problem being one of the justification, excludes such knowledge.

Although Goodman's puzzle is an interesting philosophical problem, it does not give any clearcut solution to the problem. Although all these philosophers believe that they can give an analytic justification of induction but their approaches are different. A completely satisfactory solution has not yet been found but there have been developments which constitute progress.

Many other philosophers feel that analytic approach to the problem of the justification of induction has not been fruitful in as much as the problem haunts even after such justification. They try to give an Inductive justification, which we take up in the next Chapter.