IS OBSERVATION THEORY - LOADED ?

TARITMOY GHOSH

INTRODUCTION :

Now in philosophy of science, it is more important question whether observation is theory loaded or not. Commensense philosophers and some realists argue that observation is an act and it is totally free from theory. According to them all observations are totally free from theory. But, on the other hand, some realists and all anti-realists argue that observation is an act but it is theory-loaded. At the same time we also notice a philosopher, Ian Hacking, who argues that some observations are theory-loaded and some are free from theories.

At first I shall discuss the above views about observation in brief, and then evaluating all the views I shall try to form my own opinion about this problem.

Observations Are Free From Theories

Commonsense philosophers argue that observation is an act. We observe the external objects with our sense organs. External objects are real. When our sense organs have contact with them, we observe them as they are in the world. For observing the objects, theory has no role. The act, observation, is totally free from theory.

We notice some realists to give the arguments in favour of theory free-observation. Among such realists the remarkables are Grover Maxwell, Dudley Shapere and Van Fraassen. Their opinions about observation are given one by one.

Indian Philosophical Quarterly, Vol. XXVI No.3

July 1999

A. *Grover Maxwell's View*

Grover Maxwell is a realist about observable entities as well as postulated entities. He argues that observation is an act. With the help of this act we can know the nature of the objects which are in the world. We can directly observe the objects which are large in shape with our naked eyes but the objects which are so small, are not directly observed with our sense organs. We can observe these objects with the help of instruments. cell, virus, gene etc. are observable with the help of instruments. We can observe them with the help of microscopes. I think, it would be better to quote his view for realizing his opinion about observation. Maxwell says, "..... there is, in principle, a continuous series beginning with looking through a vacuum and looking and containing these as members : looking through a windopane, looking through glasses, looking through binoculars, looking through a low-power microscope, looking through a high-power microscope etc. in the order given. The important consequence is that, so far, we are left without criteria which would enable us to draw a non-arbitrary line between 'observation' and 'Theory'. " [1]

What Maxwell wants to say is that observation is an act which is totally free from theory and this act is conducted with the help of naked eyes in case of large shaped objects and in case of small objects it is conducted with the help of instruments.

B. *Dudley Shaper's View*

Dudley Shapere like Maxwell argues that observation is to see something with our naked eyes as well as with the help of our instruments. But a little difference is noticed between their views. According to Shapere observation with the help of instruments is theory-loaded while all observations are free from theory to Maxwell. Shapere argues that when we try to observe the interior of the sun, we cannot do it with our naked eyes, we do it by using neutrinos emitted by solar fusion processes and this observation is theory-bound in the sense that what we observe is formulated in terms of our theory. But, he says, observation is totally free from theory, when we observe with our naked eyes.

C. *Van Fraassen's View*

Van Fraassen uses the term 'observation' in strong sense. He argues that observation is nothing but mere seeing with our naked eyes. What we observe with our naked eyes are real but what we observe with the help of instruments are images or artifacts only. Using binoculars or telescopes what we see are real, not images. We use such instruments to see the objects which are far from us but observable, not postulated. We may see them with our naked eyes if we are close enough. But, using microscope what we notice can never be observed with our naked eyes. They are images only, not real. So, they are not observable. He argues, ".....an unaided act of perception, for instance, is an observation. A calculation of the mass of a particle from the deflection of its trajectory in a known force field, is not an observation of that mass."[2]

Van Fraassen argues that though observation is not theory bound, yet *observing that* is theory bound. Observing that requires learning or practice. After observation we cannot identify an object if we have no previous knowledge about it. In case of mere observation, we can only know the existence of that object which we observed. But we can know the nature and attributes of that object which we observed after learning or practice.

2. *Observations Are Theory loaded :*

We also notice some philosophers who argue in favour of theory-loaded observation. They argue that all observations are theory-loaded. We have no theory-free observations. Among these philosophers, I shall mention two philosophers who are most popular in philosophy of science at present : N. R. Hanson and Paul Feyerabend.

A. *N. R. Hanson's View*

Hanson argues that observation is an amalgam of the two-pictures and language. He has given two arguments to prove that all observational terms and sentences carry theories with them. Firstly : When we use a word, we must follow some linguistic rules. For example, when we express injury, cut etc. by the word 'wound', it would imply that injury, cut etc. are the re-

sult of fight or battle.

Secondly : When we notice something, of course we have some expectations of a theoretical sort. Observation is not only visual awareness of something but also knowledge of it. Hanson says, "There is a corresponding gap between visual pictures and what we know. Seeing bridges this, for while seeing is at the least a visual copying of objects, it is also more than that. It is a certain sort of seeing of objects seeing that if x were done to them y would follow. This fact got lost in all the talk about knowledge arising from sense experience, memory, association and correlation."[3]

In favour of his argument he also says, "when language and notation are ignored in studies of observation, physics is represented as resting on sensation and low-grade experiment. It is described as repetitious, monotonous, concatenation of spectacular sensations, and of school-laboratory experiments. But physical science is not just a systematic exposure of the senses to the world; it is also a way of thinking about the world, a way of forming conceptions".[4]

B. *Paul Feyerabend's View*

Paul Feyerbend strongly opposes the views which accept theory-free observation. He also does not accept the view that observations are theory-loaded. According to him, all observations are theoretical. In fact, he does not accept any statement as observational one. He does not want to use the very phrase 'theory-loaded', because this phrase suggests that we have a sort of observational truck loaded with theoretical component. But he has no belief in the existence of such truck. Rather, he thinks that we have only theory everywhere. Though the distinction between observation and theory is not worth, yet we may curiously accept that distinction as the distinction between obvious and less obvious sentences, or between long ones and short ones. He says, "Nobody will deny that such distinction can be made, but nobody will put great weight on them, for they do not play any decisive role in the business of science."[5]

3. *Ian Hacking's View*

Ian Hacking a recent and famous philosopher of science, after denying all the above views about observation has tried to throw a new light on it. In fct his new account is something which is the combination of the two-theory free observation and theory-loaded observation. According to him, we have theory-free observations as well as theory-loaded observations. Hacking has given some platitudes of observations :-

> i) Noteworthy observations have sometimes been essential to initiat ing inquiry, but they seldom dominate later work. Experiment supersedes raw observation.
>
> ii) Observation is a skill. Some people are better at it than others. You can improve this skill by training and practice.
>
> iii) There are numerous distinctions between observation and theory. The philosophical idea of a pure 'observation statement' has been criticized on the ground that all statements are theory loaded. This is the wrong ground for attack. There are plenty of pretheoretical observation statements, but they seldom occur in the annals of science.
>
> iv) Although, there is a concept of 'seeing with the naked eye', Scientists seldom restrict observation to that. We usually observe objects or events with instruments. The things that are 'seen' in twentith century Science can seldom be observed by the unaided human senses.

Like Marxwell, Hacking also thinks that there is no clear distinction between observable/Theoretical. The entities which we can observe with our naked eyes or with the help of instruments are observable ones, but, on the otherhand, the entities which are only referred to by theoretical terms but cannot be observed are theoretical ones. According to him, if we can manipulate the theoretical entities, then they would be accepted as real i.e. they have existence. So, we may then argue that they have the possibility to be observed.

Against Hanson's arguments Hacking says that Hanson's first argument which is previously discussed is important in ordinary language, but in science or in philosophy it has no value. Besides this, Hanson's argument does not imply that every observational report carries scientific theory. If a term follows a rule, it cannot imply that this term is theory-loaded. But second argument can be accepted, because it is true. But we can never say that this argument implies that every observational term is theory-loaded.

Against Feyerbend Hacking says that factual statements, observational reports and experimental results are not same. We can not equate them. If we do so, it would be impossible to notice anything about what goes on in experimental science. By giving an example he has tried to show that experimental results and observational reports are not the same in the following way. Hacking takes Michelson - Morley experiment as an example. The chief result of that experiment was a refutation of the earth's motion relative to another. This experimental result also refuted the theory which is used to explain why the stars are not quite where they appear to be. From the above example it follows that duration of experiment is more than the duration of observation. They had done the experiment during many years with their hard labours but they observed their experimental results only for three or four days.

Against Feyerabend's view that all observational reports contain or assert theoretical assumptions, Hacking says that we have many observations which are free from theories. For example, Herschel observed radiant heat in many experiments without any help of theory.

Hacking has taken an example to prove that observation is a skill. The sister of William Herschell, Caroline Herschell was a good observer. She would observe the clear sky at night very attentively. She had a speculative mind and good understanding. When she would notice with her naked eyes a strange thing in the heaven at night, using her telescope she would try to see it closely and accurately and would try to recognize it. Due to her speculative mind and hard labour she could recognize eight comets in a single year. She discovered more comets than any other person in the history of science.

Conclusion :

From the above discussion, we get different definitions of observation. One definition is that observation is only the sense-experience. When our sense organs come into contact with the external objects, we get some experiences about them and these sense experiences are called observations.

Another definition is that observation is not only the sense experience but also more than that. Observation is the picture plus language. When we observe something, we get a picture and we get this picture as something. Always we observe a thing as something. We can not observe a thing as a mere thing. Hence, in observation, idea or theory has a great function. All observations are loaded with theories.

We also notice another definition where observation, experiment, all activities are rejected. We have only theory. The existence of all things depends upon our conceptual scheme. We observe a thing as we want to observe that. What we observe is totally determined by our conceptual scheme.

Now, we shall evaluate all the views to accept one as a more fruitful than the others. First definition is geratly accepted by the common sense philosophers as well as the general people. According to this view, there are two things in observation, one is our sense organs and another is the external objects. Our sense organs directly notice the external objects. When our sense organs fail to notice them, we can notice them by using instruments. But no theory is needed to see them. But now the question : Is it right that our observation is totally theory-free? Can we observe a thing without any previous idea? When we say that we have an observation about something, we do not say that we have a mere sense experience about that object In that case what we want to say is that we know the object very well. Hence, observation is not only a mere sense experience, it has also something more than that.

Third definition is totally idealistic. According to this view, apart from mind there is nothing in the world. Mind and mental activities are only

real and all ohter things are unreal. So, there is no question whether observation is theory-loaded or theory-free. Because if we accept observation as a separate activity of human being, then we have to admit the existence of the external objects, but the philosophers of this view do not accept the reality of the external objects.

In the second definition, it is said that observation is not only visual awareness of something, it is more than that. When we observe a thing, we get a picture and we get this picture as something. So our observation is theroy loaded.

Now I want to give my own exposition about observation in the following way. I think that it is not easy to say observation is mere seeing or theory-loaded. If we say that observation is mere seeing, an object would be equally accepted by two normal and educated persons. But we notice many controversies among the well-educated persons to say about a thing or an event. On the other hand if we say that observation is theory-loaded, then many problems will arise. A blind man who is educated cannot say properly the attributes of external objects. He can only say the existence of the object by touching it. If observation is theory-loaded, the well-educated blind man be able to say the attributes of an external object. But it is not possible at all.

So, I think, observation is not mere seeing, and at the same time it is also not totally theory-loaded. At first time our sense organs are in contact with the objects. and than our earlies experience help us to understand the objects. At first time we know the existence of object - this type of act is called indeterminate perception. And then we know the object related with attributes - this act is called determinate perception. Jointly the indeterminate and determinate perception is called observation.

Electron, Proton etc. are not observed with our naked eyes or with the help of instruments. But we can recognize them by seeing the phenomena which are caused by them. By controlling phenomena we can use these entities, but we can not perceive them, we can only intuit them. With the sense organs we can only observe the opaque surface of the world. But

by intuition we can observe such things which are not possible to observe with our naked eyes or with the help of instruments. Electron, Proton etc. are such things which are observed by our intuition or reason, but not by our sense organs.

So, I think, observation is an act to know the true nature of an object or an event. Seeing is the first condition of it where intelligible thinking is the second. When a lawyer says, 'I am observing your case', the lawyer does not want to say that he is mere seeing the case; he wants to say that he will take care of the case intelligibily. When a doctor is asked what he observed about the patient, it is not said that doctor has seen the mere physical appearance of the patient. Doctor at first notices the symptoms of the patient and from these symptoms he understands the actual cause of the disease. So, observation is not mere seeing. Observation means seeing plus understanding.

NOTES

1. G. Maxwel, 'The Ontological Status of Theoretical Entities'. *Minnesota Studies in Philosophy of Science,* III, 1962, p-7.
2. Bas Van Fraassen, *The Scientific Image,* Clarendon Press, Oxford, 1980, p.15.
3. N. R. Hanson, *Patterns of Discovery,* Cambridge University Press, London, 1958, p - 29-30.
4. *Ibid*, p - 30.
5. P. Feyerabend, *Against Method,* London, 1977, p - 31.