

ON SCIENTIFIC INTERPRETATION

One of the strongest urge of man is to know about his observable environment. And the most important function of a scientific theory is to satisfy this need.

The influence of model in interpretation of a theory has played an effective role. For example, the achievement of mechanics is so striking that some outstanding philosophers of physics like Kirchhoff and Mach hold that the ability to condense a potentially infinite set of information, law-like statement into a single manageable formula, is the only function of a scientific theory. However, we need not share their belief because we do not confuse the 'bare theory' with the 'Model'.

Now, between the 'Bare theory' and its model, there lies a very fundamental concept of interpretation. At times, it is quite explicit. At times, it is so implicit that the distinction between the theory and model becomes very delicate. Unless there is initial awareness of the distinction between the two, and unless there is sufficient acquaintance with the context, a model may be taken for a theory. But theory does not only summarise the laws and facts established. It also has predictive function as we well know that the predictive function of an empirical theory is more spectacular than its summarising success e. g. the prediction of a solar eclipse to its last possible detail has so impressed the philosophers of science that quite a few of contemporary philosophers of science hold in esteem this predictive function of scientific theory as did A. Comte, the father of the Philosophy of Science.

A scientific theory has other functions of 'controlling' and 'explaining' the phenomenon. 'To control' is to bring about the desired change of environment and this aspect was implicitly identified by William James, with the 'truth' of the theory. Needless to debate the issue, because such truth must necessarily be the pragmatic dimension of truth. When a theory is interpreted either analytically, contextually, or in the light of the model, there is no loss whatsoever of these functions of the theory.

The Interpretation of a theory :

The interpretation of a theory may be carried on two levels.

1. The contextual 2. With the help of a model.

Before considering these two types of interpretations, it is important to note that the problem of interpretation arises only in the phenomenon not quite ordinary. The immediate example that I can think of is that of the sign board "Keep to the left" on the road side. Interpretation is easy here simply because the communication is direct and in the manner in which we are habituated (trained) to understand the sign board 'keep to the left.' On the other hand, the phenomenon which is generally not explained in the manner in which we are habituated to understand, required interpretation. Examples of such non-ordinary and ordinary phenomena could be multiplied, and so those of interpretation of nonordinary phenomena and the accepted interpretation of the ordinary. Now, the distinction between, what marks one as ordinary and the other as not, requires no elaboration because it is well understood. The accepted and the seasoned communications need not be freshly interpreted unless there is a specific demand for that.

On the other hand, there are cases in every walk of life which compel or force themselves upon us for interpretation. But my concern here is to consider scientific theories-whom Karl Popper calls systems of signs or symbols. An interpretation is closely linked with signs and symbols. The interpretation of symbols, signs, sentences, gestures or phenomenon is the interpretation of the symbol 'P'. E. g. it may be interpreted as '2' which may be further interpreted as a consecutive unit on a numerical series or it may represent two units of milk, two chalks. etc.

Now when 'P' is interpreted as '2' on a numerical series, the interpretation is more contextual than modelled. The contextualists hold that the way in which theoretical concepts function in a scientific theory is given what is technically called an interpretation of the calculus expressing the theory which works from the bottom of upwords. The final theorems of the calculus are interpreted as expressing empirically testable generalizations, the axioms of the calculus are interpreted as propositions from which these generalizations logically follow, and the theoretical terms

occurring in the calculus are given a meaning implicitly by their context, i. e. by their place within the calculus. So, an understanding of a theoretical concept in the scientific theory is an understanding of the role which theoretical term representing it plays in the calculus expressing the theory; and the empirical nature of the theoretical concept is based upon the empirical interpretation of the final theorems of the calculus. These technical requirements can be said to have been fulfilled when No. 2 is interpreted as a unit on a numerical series. In such a contextualist account, where meaning of a theoretical term is adequately communicated, there is no need to look for a model. Of course a satisfactory account by contextualist is possible only because there has been a full understanding of the theoretical concept which Quine calls 'semantic ascent'. But for many people it is simpler to employ a model to a scientific theory than to understand the uninterpreted scientific theory its bare form: The deductive model itself is thought of as an interpreted system, which may be reinterpreted to the advantage of the context. Thus the modelist interpreted the originally interpreted theory suitably, while contextualist interprets the originally uninterpreted theory.

And hence, the expectations in interpretations of these two methods are slightly varied. The contextualist interpretation may be more process-oriented and hence, has less predictive expectations, while a modelist interpretation is more established and hence, more predictive.

If No. 2 is interpreted as a second step in a geometrical theorem, or the sum of two digits, or two units of milk, then we have definitely employed some model and have made some kind of prediction possible, though these might have little explanatory value.

However, informational or cognitive function of a theory is better served by 'interpreting a theory in the light of a model, for, models are but 'seasoned experiment', tested, varified and accepted for their utility; a bare theory may not be able to serve with equal amount of efficiency. Someone might hold that a model is predictive in a way in which a bare theory is not. It yeilds new generalizations about observable properties which the theory itself does not provide; i. e., they can be used for making new predictions; so a modelled theory will be stronger than the theory in its bare form. Very true, but the moment one empirical evidence nullifies

the propriety of employing a particular model, the entire generalization falls off.

Interpretation and analysis

An interpretation is not an analysis. Analysis no doubt, is a permanent feature of the interpretation. Analysis herein, may be implicit or elaborate. But it must be present in any interpretation. But interpretation is something more than sheer analysis. It would be foolish to interpret without employing analysis. One must have proper grounds for interpreting 'P' as 'It is raining' and not as 'zero'. E. g. 'P' is interpreted as 'It is raining'. The relationship of 'P' and 'It is raining' is the point at which analysis could be carried on. Why should 'P' represent a proposition and not 'Paris'. It would be an over-statement to say that we decide it arbitrarily, when we say that 'P' stands for proposition and not for Paris; it is because the entire context in which the discussion is made and expected to be interpreted is of a particular nature. It can be said that the interpretation basically takes into consideration say, the context, the Universe of discourse, the range of significance and so on. Suitable technical nomenclature may be used, though the principle recommended is the same. The principle is this:

Interpretations have necessarily been influenced by the context, and hence, have no likelihood whatsoever of being arbitrary. A seeming choice at interpreting 'P' as 'Paris' or 'It is raining', is no choice at all, in any one single act of communication. An uneasiness about there being an element of arbitrariness accompanying every interpretation is mainly due to a mis-conception that 'one is free to interpret any way.' Rhetories have added to it by such statements, 'Well, I leave it to your interpretation.' There can be only one interpretation of any sign, symbol, sentence, gesture or phenomenon. And this assertion is the result of analysis. Where sufficient and proper analysis has been carried out, one is face to face with 'The Interpretation.' Analysis only confirms the interpretation.

Interpretation and communication : 'P' is interpreted means that 'P' has communication value. Or, it would not be interpreted. There are instances of some strange script being not interpreted because there is no proper context, and hence no appropriate

model. It may be argued and quite convincingly that after all, the so called interpretation does not accompany any symbol as such. It is 'the interpreter' who gives it a value according to the context of his own acquaintance and the general nature of the symbol.

Very true, but this would be the interpretation of the kind of a second degree. The first degree of the primary value of 'P' is that alone which the author of 'P' had in mind. In case the interpreter's own value coincides with that of the primary value of 'P', then the communication is perfect. Till then, no claim to the perfectness of communication need be made. Now, the author of 'P' may be any agent, human or not. If the agent is human, verification of the intended meaning of 'P' becomes easier and even possible. Otherwise, we have to take recourse to the impersonal rules. The non-human agent such as the framework, context, a range of reference can serve as suitable standards by which some kind of verification could be had.

A model of a theory is such a standard. Interpretation is the conceptual distance between a theory and a model. There is a sense of comprehensiveness when a theory is interpreted with reference to some model, obvious or implicit. A contextual interpretation is more of a process than a compact whole which any scientific theory attempts to remain.

Faculty of Arts,
M. S. University
BARODA-3

(Miss) Yogini Nighoskar

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