CHAPTER VI

CONCLUSION

VI. 1 Preliminaries

In this concluding chapter, let us furnish some more details of the split epistemic approach. I distinguish between our reasons for believing in the existence of unobservables and our general epistemic attitude towards scientific knowledge. Scientific realism is normally comprises a general epistemic attitude that scientific theories are true. However, selective skepticisms comprise the reasons for believing in what a theory states. Scientific realism, unlike selective skepticisms does not provide us exact hints as to why we should believe in the existence of unobservables. Selective skepticisms are recent developments in the literature of philosophy of science. The supporters of selective skepticisms are keen in developing notions like ‘detectability’, ‘manipulability’, ‘identification of structural features’ etc. in order to supplement reasons for believing in selective parts of the theory. Scientific realism can be regarded as a general stand and a more idealized attitude towards scientific knowledge. Truth of theories is the reason for believing in the existence of unobservables, provided we know what truth is.

I now explain the notion of ‘epistemic indicator’ which I introduce in this thesis. We already saw that selective skeptics used a variety of ‘indications to believe’ like ‘detection’ or ‘manipulation’ to justify their beliefs about specific knowledge. These are epistemic indicators. I argue that epistemic indicators are domain specific. For example, we may not be able to causally interact with an entity stated in a theory in economics. This, of course is a sweeping statement but I believe it uncovers the issue. Physics and allied disciplines give a lot of importance to ‘causal contact’; but there are other areas of knowledge where explanatory power and consistency with established theories yield more confidence in our knowledge claims than causal interaction. A lot needs to be clarified in this respect and I am afraid there are a lot of open ended issues at stake too. However, the aim is to leave scope for further development in this line of thinking having set up an initial direction.
VI.2 Epistemic Indicators

In order to make further inroads into the intricacies of a split epistemic approach, we need to distinguish between epistemic indicators and what is generally regarded as epistemic virtues. Usually we consider the following as theoretical virtues: consistency, unifying power, simplicity, coherence, fertility, scope, and even elegance and beauty. However, it was believed that some theoretical virtues are epistemic. Both Kuhn and Bas van Fraassen treated all theoretical virtues as pragmatic, but having inevitable roles in theory choice. Scientific realists believe that some theoretical virtues like consistency are epistemic. Typical examples of epistemic virtues include: consistency, truth, empirical strength, axiomatizability etc. However, such views are not well received within the ongoing scientific realism debate. This is because of the latent difficulty in defining these virtues as well as in applying them to disparate cases in science. Jones (2002) gives us the following hints regarding the nature of theoretical virtues:

[A] desideratum X [is] a pragmatic virtue just in case X is relevant in theory choice due to person-or context-related reasons, that is, insofar as X's relevance concerns the use or usefulness of theories….A desideratum X [is] an epistemic virtue just in case X is relevant in theory choice due to the epistemic goals of (our) scientific theories, that is, insofar as X's relevance concerns either the relation between theory and the world, or purely logical properties and relations within the theory. Crudely restated, anything that satisfies or furthers an epistemic goal is an epistemic virtue. (2002: 1)

The discussions on theoretical virtues relate to theory choice. Pragmatic virtues are associated with the use of a theory and epistemic virtues are about the theory’s representative success. For example, if we regard empirical success as a pragmatic virtue, then it means that, based on empirical success, we cannot claim that the theory is representatively successful. This was the whole allusion behind the scientific realism debate. Empirical success and explanatory power etc. are usually considered as pragmatic virtues, and they pertain to the usefulness of scientific theories, rather than denoting to the link between theory and world. Similarly, if we consider consistency as an epistemic
virtue, then the theory in question can be at least regarded, in a certain sense, a step closer towards representing the world (if not really representing the world).

The epistemic indicator is normally the aspect in a philosophical position which gives us reasons for what to believe about the world. This, of course is, a very vague formulation, but an example will bring in some clarity. Chakravartty believes that ‘being able to detect’ is a sufficient reason to believe in certain statements of the theory which are about the unobservable world. According to him, to come across a causal property of an unobservable aspect of the world shows us that it is real and it exists. There is an indication provided by ‘causal contact’ and ‘detection’ that what we believe about the phenomena is right. Therefore, these are epistemic indicators believed to have the potential to indicate that the representation is capturing the world. They indicate that we can be warranted in believing in the existence of a phenomenon. Most philosophical positions in the scientific realism debate consist of epistemic indicators. Bas van Fraassen believes in the truths of statements about observable domains of the world. This is because he believes in the epistemic indication provided by observability. The unobservable parts of the world are unreachable as far as the epistemic indication of observability is concerned. van Fraassen does not believe in indirect observability. However, he believes in the empirical adequacy of statements about the unobservable domains. In my reading, he maintains that truth is an epistemic virtue and, observability is an epistemic indicator in the observable domain. As far as the unobservable world is concerned, Bas van Fraassen regards empirical adequacy as a pragmatic virtue and thus there is a lack of epistemic indicator. Therefore, he remains an antirealist about the unobservable domains of the world.

The same is the case about Hacking, Worrall and many others. They are looking for unique epistemic indicators which function in specific contexts. The same epistemic indicator might not lead us to hints about what to believe in all cases. The scientific realist’s notion of ‘truth’ is just an epistemic virtue. The realists would have to provide an epistemic indicator to warrantedly believe in unobservable parts of the world. They usually stick with ‘extendable perception’ as a strong contender for believing in unobservables. But soon we will see that this leads to more problems than gains.
Structural realists believe that structural retention is an epistemic indicator wherein they are warranted to claim that the theoretical components having structural features capture the world. I argue that, unlike most epistemic virtues, epistemic indicators are domain specific. If we are to look for an epistemic indicator in radio astronomy, then we must hold detection (indirect) as an indicator. Similarly, a life scientist working in molecular biology will be prioritizing certain epistemic indicators like consistency with Darwinian theory rather than indirect observation, precisely because the specific context generates and makes available such indicators. Further, a theoretical physicist in contemporary field theories will be believing that the recurring mathematical equations are the indication to what he believes to be the case in reality. The epistemic indicator for structural realism is contemporary physics-generated. Theoretical virtues like truth is not discipline specific, but epistemic indicators vary from one context of knowledge to other. Truth can be regarded as the epistemic virtue we look for in all the contexts of knowledge.

In matters related to the ‘warrant’ of our beliefs about the world, we are indicated by something’s existence by these indicators. The notion of truth, even if considered as a supreme epistemic virtue is unproductive as far as our ‘warrant’ to beliefs is concerned. Truth prevails because epistemic indicators like observability, causal-contact and indirect detection allows us to validate our beliefs as true. I believe that epistemic indicators precede epistemic virtues. If we assess the epistemology of science from a meta-epistemic perspective, we can understand that the precedence is conceptual and not temporal as in an intellectual activity. Without the epistemic indicators, we will not be in a position to even say that the theory is true or consistent. However, the major point to be noted in the discussion on epistemic indicators is that they are all domain specific.

It is worth paying attention to a set of epistemic indicators which are context-generated. Can we say that the usual theoretical virtues like consistency, unification, axiomatizability etc. are all epistemic indicators? I propose that the context in question would help us tackle such issues. In a severely mathematics-ingrained area inside theoretical physics, we need to consider axiomatizability and consistency as epistemic indicators. We may not be in a position to consider manipulation in such contexts (e.g.
cosmology) because they may not have the potential to indicate what to believe. The precedence with respect to identifying epistemic indicators rests with the context in question.

However, the question of whether axiomatizability and consistency are also indeed epistemic virtues is also relevant. Whether they are the ultimate benchmarks in issues regarding rational theory choice? However, my proposal is to set aside issues with respect to theory choice and epistemic virtues for the time being and focus on the issue of epistemic attitude and the role of epistemic indicators. The discussions of epistemic virtues are, in a certain sense, idealized talk about norms in theory choice. They help us to deal with choosing one scientific theory over the other. However, epistemic indicators help us to choose one epistemic attitude (philosophical formulation of science) rather than another.

I would like to argue that concepts like axiomatizability and consistency are just a few from a set of several epistemic indicators, out of which most would not be available in a particular context. In a context where there is more than one epistemic indicator, further clarity is called for. Observability is a very basic epistemic indicator. We may encounter observability as well as manipulability in the same scenario. In such contexts, it is always better to resort to the stronger epistemic indicator. But we may have differences in believing in one epistemic indicator over the other. I remain agnostic as to whether such meta-epistemic concepts are available in adjudicating between these indicators. Here, being pluralistic might just be the only option.

The major proposal that the split epistemic attitude puts forth is the following—rather than fixing what kind of an attitude and epistemic indicator we ascribe to a scientific knowledge context, let us see whether the scientific knowledge context provides us with the relevant epistemic attitude and epistemic indicator. Now, history of philosophy of science itself is witness to several split approaches which operate with different epistemic indicators. The following table will make it clear.
<table>
<thead>
<tr>
<th>Philosophical Position</th>
<th>Epistemic Indicator</th>
<th>Theoretical Virtue</th>
<th>Epistemic Attitude</th>
<th>Domain of Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constructive Empiricism</td>
<td>Observability</td>
<td>Observational Truth</td>
<td>Realist</td>
<td>Observable world</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>Empirical Adequacy</td>
<td>Antirealist</td>
<td>Unobservable world</td>
</tr>
<tr>
<td>Semirealism</td>
<td>Detectability</td>
<td>Truth/Similarity</td>
<td>Realist</td>
<td>Detectable World</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>None</td>
<td>Antirealist</td>
<td>Undetectable World</td>
</tr>
<tr>
<td>Structural Realism</td>
<td>Structural Features in Theories, Structural retention etc. (e.g. mathematical equations)</td>
<td>Truth/ Similarity</td>
<td>Realist</td>
<td>Structural Aspects of the Observable and Unobservable World</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>None</td>
<td>Antirealist</td>
<td>Non-Structural Aspects of the Observable and Unobservable World</td>
</tr>
<tr>
<td>Entity Realism</td>
<td>Causal Contact</td>
<td>Intervention</td>
<td>Realist</td>
<td>Knowledge of Entities in both Observable and Unobservable worlds, where Intervention is Possible</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>None</td>
<td>Antirealist</td>
<td>Theoretical Knowledge</td>
</tr>
<tr>
<td>Scientific Realism</td>
<td>Observability/ Extended Perception</td>
<td>Truth</td>
<td>Realist</td>
<td>Both Observable and Unobservable Worlds.</td>
</tr>
</tbody>
</table>

Table 4. Philosophical Formulation and Epistemic Indicators.
However, my proposal goes a step further. We need not have to believe in what a theory states by holding on to seemingly stable epistemic indicators in observable or unobservable domains. We may keep our options open and see if there is scope for an epistemic attitude on a domain of knowledge hinted by the domain itself.

Let us now move onto a derivative that emerged out of the discussion on epistemic indicators. As said before, the interesting fact is that scientific realists are not so clear about the epistemic indicators available to them. Perhaps the thesis of scientific realism is not as sophisticated as the various selective skepticisms. This is evident in their resoluteness that truth is the measure of scientific knowledge. They claim that our beliefs about unobservables are warranted because these beliefs are true.

The view that scientific theories correspond to the world by bringing in referential success is a credible philosophical view. The descriptions of truth-bearer and truth-maker are also components in such a tale. But this could be the case in an ideal scenario where proper epistemic indicators are at play together with the availability of meta-epistemic perspectives. The scientific realist often sounds similar to the story of ‘Archimedes’ lever’ where it was believed that Archimedes had claimed that a lever long enough and a place to stand would enable him to move the earth. But simply there are no such place and lever.

The scientific realist’s assessment of scientific knowledge and truth would demand us to ‘jump out of our skins’ to a meta-epistemic perspective. Also, the ‘truth of theories’ sounds rationally compelling in observable domains. Scientific realist’s slogan of ‘unobservables exist’ cannot be guaranteed with the naïve conceptions of truth and referential success. In the thesis of scientific realism, there is an absence of proper epistemic indicator concerning the unobservable world- a fact which ably exploited and tackled by the selective skeptics. When our beliefs about certain features of the world are stated, the selective skeptics and constructive empiricists in the debate have justifications of these beliefs in terms of observability, detectability etc. That is, they have justifications in terms of epistemic indicators and not epistemic virtues. We may be tempted to say that the scientific realist believes in unobservables based on our ability of indirect perception to validate true statements. However, this would bring in an immediate worry. For the
scientific realist, the truth of theories is the hallmark of scientific knowledge. Truth is not attained by our ability to observe or detect; these are epistemic activities. Truth is independent to any epistemic activity. Therefore, the belief in unobservables is warranted by truth of theories, not our epistemic abilities. If such is the case, then it is impossible to adjudicate something as ‘true’ or ‘false’ based on our experience. The entire idea of a past theory becoming false rests on the belief that we adjudicate it to be false based on several epistemic considerations such as observability and detection. The point is that scientific realist thesis entertains a non-epistemic notion of truth, which gives us a picture of truth that is not contextually-assessable because in all contexts of truth assessment, we will have to rely on verification, assertability etc. which are epistemic in nature.

Therefore, the ineffectiveness of any epistemic indicator in the case of scientific realism is because of the non-epistemic account of truth they maintain. NMA amounts to saying that scientific theories are successful because they are true in a non-epistemic sense. The activity of searching for true theoretical components in past scientific theories is an epistemic activity which goes against the spirit of scientific realism. This is because we are looking for the link between certain components in those past theories and their connection to the world- some kind of a post hoc intellectual activity which is dependent on epistemic considerations like verification. If a past scientific theory was adjudicated as false based on epistemic considerations, then why do the scientific realists believe that past theories are indeed false? Truth and falsity are not epistemic matters but non-epistemic matters according to the scientific realist. Similarly, the view that past scientific theories are partially true cannot be established without shedding the non-epistemic account of truth by observing empirically what the case really is. So the scientific realist’s endeavors into history of science have a second roadblock other than historical meta-underdetermination. The historical pursuit of the scientific realists itself goes against some of their core beliefs.

VI.3 Conclusion

We analyzed in the previous chapter whether concepts like consistency or surrogative reasoning can mend the shortcomings of the scientific realism debate by overcoming historical meta-underdetermination. However, the only useful proposal
which arose was to undertake historical investigations with openness. We saw that there are no historically neutral and meta-epistemic concepts which can be used in adjudicating one position’s aptness over others.

Similarly, there is difficulty in fixing the priority of epistemic indicators in various knowledge contexts where there is more than one epistemic indicator at play. One may be tempted to say that we need to be flexible enough to entertain more than one epistemic indicator at the same time. In a context where we have the availability of both axiomatizability and detectability, then we need to be simply realist about both structures and detectable knowledge. We can be pluralists in our epistemic attitude too. Perhaps we are being too much flamboyant here. In most scenarios in science, there is no availability of an epistemic indicator. Mostly we need to stick with explanatory power, scope etc. These virtues do not give us sufficient reasons for believing in what a theory states. That is, in most contexts of knowledge, the context in question does not throw sufficient hints as to whether to be a realist or antirealist. However, my proposal is to keep the options open. A theory at a particular time may not be susceptible to a particular epistemic indicator but might invite one during the course of its life.

To come back to the initial issue, the unavailability of meta-epistemic concepts is the reason for our failure in answering historical-meta underdetermination. Thus, scientific realism cannot be tested against history of science (the difficulties I exposed in chapter V). Therefore, Laudan’s challenge remains unanswered if we are attempting to answer it by involving in historical pursuits. The positive aspect emerged out of the discussion in this thesis is a direction of thinking, of keeping a split epistemic attitude to past and current scientific knowledge. Does a split epistemic attitude undercut the methodology of science? This is the perennial question that runs against my proposal. However I showed that most of the philosophical formulations in the history of philosophy of science are split. The only difference is that they all have stable epistemic indicators. I have further argued that, there is no need to maintain a stable epistemic indicator because the very concept itself is domain specific.