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## **Epistemology and Science: How the Relationship Fractured**

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## Abstract

Throughout the history of scholarship, the role of epistemology was considered indispensable for the cultivation and development of science. Over the last few centuries, however, this relationship has been challenged by the scientific establishment. The drive to discredit epistemology culminated in the crusade launched by the Logical Positivist movement of the 20<sup>th</sup> Century. All of these efforts were predicated on the contention that science was value-neutral, objective, and metaphysically free. It was therefore not answerable to any supra-scientific tribunal, such as epistemology, to justify its claims of truth. When Muslim economists began their project of Islamising economics, they subscribed to the neutrality thesis of modern science and thus wholly neglected to consider the epistemic implications of their endeavour. Their project, as a result, has now reached an impasse. In the first of this two-part study, after introducing the reader to the Islamisation of Knowledge, I define and explain the significance of epistemology, and outline its connection to the sciences. I then examine in detail the several objections against epistemology, which, nonetheless, ultimately fail to dislodge its pre-eminence within the scientific enterprise. The much-vaunted claim of modern science that it is free of metaphysics is evaluated and shown to be fallacious and misleading. I demonstrate that all scientific enquiry is ineluctably embedded within a set of *a priori* claims about reality. Any such framework is consequently metaphysically orientated, since it is predicated on presuppositions that are extraneous to the empirical method. In the next part of this study, to be published separately, I will explain how economics fell under the spell of positivism and consequently fashioned itself under the guise of an objective science, with dire consequences for the discipline. Islamic economics, while attempting to infuse ethics into its theory, also found itself in a similar situation. Both of these disciplines are now undergoing a crisis, due to their unwillingness to interrogate the philosophical underpinnings of their science.

Key words: Islamic economics, epistemology, science, positivism

## 1. Introduction to the Study

Throughout history, Muslim civilisation has prided itself as a knowledge-oriented society. This is because of the supreme value that Islam places on reflecting and learning about human life, existence, and our relations to God and the Hereafter.<sup>1</sup> This particular emphasis on *ilm* (an Arabic word normally translated to mean knowledge) has consequently “dominated Islam and given Muslim civilization its distinctive shape and complexion” (Rosenthal 1970:2; see also Rahman 1968).

Notwithstanding the central importance of the above, when Europe experienced its socio-politico-scientific upheaval in the form of the Reformation, the Scientific Revolution and the Enlightenment, there appeared to be a corresponding decline in the Muslim world’s vitality and enthusiasm for further intellectual/scientific advancement (Rahman 1984, Saliba 2007). With the tide of colonialism that soon followed in its wake, much of the Islamic world’s rich and vast intellectual legacy was effaced from most of its institutional memory and replaced with rationalist modes of thought imposed by Western imperialist forces. In order to protect and preserve their integrity against the overbearing pressures of secularisation and modernisation, the traditional religious sciences<sup>2</sup> turned inwards. They withdrew from any kind of active engagement with the natural and human sciences that had already gravitated towards positivism. The ensuing alienation dichotomised learning within the Muslim world and the unicity of knowledge began to disintegrate. A gulf formed between the two sides and widened to such an extent that a degree of suspicion, antagonism and even rejection towards the so-called “secular” sciences was evinced by certain elements within the religious sciences establishment (see also Bakar 1991).

When Muslim nations began to regain their political independence during the 20<sup>th</sup> Century, scholars endowed with a depth and breadth of Islamic learning recognised the need to rehabilitate the classical tradition of Islam in which no such spurious dichotomies of *secular* and *religious* knowledge existed. All useful knowledge was deemed to be from God, Who bestows it upon His creation for the most sublime and mundane purposes. The only permissible demarcation was between beneficial and non-beneficial knowledge. Imbued with this all-embracing attitude and fervour towards integrative knowledge, the first seeds were planted in the circles of Islamic

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<sup>1</sup> This is evidenced, for example, by the fact that in the first instalment of Revelation that the Prophet Muhammad (Peace be upon him) received, four of the five verses make reference to reading and/or learning.

<sup>2</sup> Traditional religious sciences refer to classical Islamic scholarship in the so-called “primary” sciences, such as Qur’anic exegesis, *Hadith* (Prophetic Tradition Studies), *Fiqh* (jurisprudence), etc.

scholarship to revive the Islamic heritage of a unified body of knowledge that could seamlessly transcend the religious-secular divide.

The initial impetus for this intellectual movement was largely inspired by the writings of Jamal al-Din al-Afghani (d. 1897), Muhammad Abduh (d. 1905), Muhammad Iqbal (d. 1938) and Said Nursi (d.1960). Given the immediate relevance of economic thinking for Muslim communities, the first calls to develop Islamic economic theory in particular, came from Sayyid Qutb (d. 1966), Abul Ala Mawdudi (d. 1979) and Baqir al-Sadr (d. 1980). It was left, however, to a subsequent generation of thinkers<sup>3</sup> to articulate in modern academic parlance the form, shape and content of the nascent enterprise of the “Islamic Sciences”. Chiefly among them are Nasr (1968, 1976), al-Attas (1978, 1985, 1995), al-Faruqi (1982), Choudhury (1983, 1990, 2004, 2006, 2011) and Sardar (1985, 1988, 1989).<sup>4</sup>

However, the issue was not elevated to global status for Muslims around the world except after 1977, when two international conferences were held in quick succession in Switzerland and Saudi Arabia, one on Muslim Education and the other on the Islamisation of Knowledge (IoK henceforth). Not only did it sensitise Muslim educators to reflect upon how they approached the transferral of knowledge to learners but, more importantly, it mobilised and ignited the conscience of many Muslim intellectuals to actively participate and contribute towards the programme (Adebayo 2006). To further this research agenda, associations of Muslim intellectuals and professional bodies, Islamic research centres, and Islamic universities have been established in many Muslim countries to actively network and explore ways in which their disciplines and specialised fields of study could be “Islamised” (see Husain 2006).

Driven by a similar spirit, thousands of books, journal articles and numerous conferences, workshops and symposia, focusing especially on Islamic economics (IE henceforth), have generated a vast body of literature in this area. The wave of enthusiasm spread far and wide, such that even a country like South Africa, with its small minority Muslim population, established its own Muslim professional bodies and successfully hosted several international conferences in this regard.

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<sup>3</sup> Interestingly, but not surprisingly, many in this group have received some form of academic training in the West.

<sup>4</sup> Some important differences exist among these scholars, however, on how this ought to be conceived and what the challenges are for its realisation.

## **2. Background to the Problem**

It is approaching five decades now since this enterprise was begun with earnestness and enthusiasm, and which imbued within the Muslim psyche a renewed vigour and sense of mission (Nasr 1991). However, despite a plethora of writings in this cross- and multi-disciplinary project, it should be asked whether contemporary Islamic scholarship has delivered on its promises to revolutionise knowledge in the various domains of academic thought. At the very least, it must be questioned as to whether the groundwork or foundation has been laid to enable the next generation of Muslim intellectuals to build upon it.

### **2.1 The Mission Falters**

Hardly ten years had passed since the formal inauguration of the IoK agenda and many were already beginning to question the shape and form of the burgeoning enterprise unfolding in its wake (Sardar 1988; Rahman 1988; Kirmani 1989). Its application hitherto was so superficial and blinkered that alarm bells were raised regarding the “jejune nature of the [then] current approaches to the issue”, which, it was feared, would eviscerate the “Islamisation project of its creative potential” (Nasr 1991:3-4). Sardar (1984,1985), while providing critical arguments for a distinct Islamic approach to science, also warned that if it were not carefully thought out, the project could lead to the Westernisation of Islam instead. The fate of IE was specifically highlighted in all of these early critiques. So serious were some of the objections raised at the time that concerns were expressed as to the very survival of the project itself (Nasr 1986; Sardar 1988; Haneef 2005).

It appears, though, that the proponents of IoK, particularly the Islamic economists, did not take heed of the critical advice given to reflect upon and re-orientate their mission. Notwithstanding the well-intentioned attempt by those involved in this international drive, Muslim scholars who were deeply involved in it from its inception are of late conceding that their efforts to recast modern science and its various sub-disciplines within an Islamic “mould” have been misconceived and that “something has gone wrong” (Chapra 2000; Choudhury 2001a; Sardar 2004; Kahf 2004; Siddiqi 2008, 2011). Various explanations have been proffered for what Siddiqi (2008:1) laments as the “collapse of the grand Islamic agenda”. Further, IE was again singled out as a case in point. Contributors have been heavily censured by both critics and proponents alike for failing to “articulate a sound and coherent theoretical paradigm for the discipline, let alone in demonstrating how it would find practical expression in the real economy” (Mahomed 2013:558).

Having recognised that something was amiss in their efforts to provide an alternative framework for examining economic issues and concerns, several international forums<sup>5</sup> have been convened to engage in a process of “soul-searching” and self-critique to unravel why their mission has remained unaccomplished. One of the central themes to emerge from these discussions is whether IE needs to be reconceived afresh as a new paradigm, or whether it should continue to evolve within its current framework of classical-neoclassical-Keynesian economics and its methodology. Clearly, the path that it adopts will once again determine the future trajectory of growth for the discipline.

Some scholars, such as Kahf (2004, 2012), al-Jarhi (2004) and Zarqa (2004), argue that IE ought to remain within the purview of mainstream economics (ME henceforth) and that with relatively minor adjustments and modifications, the former can easily be accommodated within the latter. On the other hand, the more avant-garde Muslim intellectuals such as Choudhury (1993; 1999, 2006, 2008a), Nasr (1986, 1989), Sardar (1988, 1989, 2004) and Zaman (2005, 2011) are vehemently opposed to developing IE as an offshoot of ME. They aver that it is due to its slavish imitation of Western counterparts that IE has dismally failed to achieve any substantial degree of success. Others scholars, some of whom are pioneers in the field, including Sidiqqi (1970), Mannan (1970) and Chapra (1979, 1992), favour a more circumspect approach whereby the essential concepts of ME science are juxtaposed and evaluated against those from an Islamic framework and subsequently integrated, modified (or rejected) within IE theory.

Invariably, a careful reading of most of the literature on Islamisation generally reveals similar fault lines concerning the way in which to confront this challenge. Therefore, despite much constructive debate in terms of both depth and breadth, no consensus emerges. One is therefore left wondering as to the reason or reasons for this lack of agreement on such axiomatic principles. What might help to explain the failure of these distinguished experts to agree upon a unified approach at this critical juncture of their mission?

## **2.2 The Problem Detected**

At the heart of the many contestations lies the fundamental question of the identity of the discipline. What is unique about Islamic economics, as hitherto enunciated, that warrants its claimed status as a distinct discipline? Does it have a clear and unambiguous body of concepts and categories that reflect its worldview? Has it developed a methodology that is able to integrate

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<sup>5</sup> For example, workshops and seminars organised by the Islamic Research and Training Institute (in 2004), by the Islamic Economics Research Centre (in 2008 and 2012), by the International Institute of Islamic Thought (in 2011) and, most recently, by ILKE Association of Science Culture Education, among others, in Istanbul (in 2013 and 2014).

its values and ideals, together with its historical legacy, and mesh these into its content and outcomes? How does it derive its institutions and the required policies and corresponding instruments, so as to give practical expression to its stated aims and objectives? Finally, and crucially, to what extent has it been able to synthesise both the *a priori* and *a posteriori* modes of enquiry into a relational framework so that knowledge induced therefrom is both interactive and integrative?

Clearly, these questions are deeply epistemological and hence critical and indispensable to the founding of an academic discipline. If they are not addressed comprehensively, then — as Einstein (1949:683-684) warned — scientific enquiry will become “primitive and muddled”. When they are examined in the light of the current discourse on IE, the discipline is found to be severely wanting in almost all of these areas. There is hardly any debate or high-level discussion on any of these questions. It is the thesis of this study that seemingly irreconcilable differences have arisen among Islamic economists because they have not paid adequate attention to epistemology, especially considering that their ambitious project required the reconstruction of human intellectual thought. Under these circumstances, it was unlikely that a unified body of thought would emerge to provide firm groundwork for the discipline to grow and mature, and they also help to clarify why the vision of Islamic sciences generally has hitherto remained unfulfilled.

Given the primal role that epistemology plays in the generation of knowledge (Popper 1959) and in colouring “the lenses through which we see the world” — i.e. our *weltanschauung* (see Dilthey 1960) — this two-part study seeks to explore this topic and its relevance for IE. The rest of this first paper is structured as follows. I begin by explaining the meaning of epistemology, after which its need and significance as a sub-discipline in itself is examined, and also how it relates to the other sciences in general. In Section 4, some of the objections against epistemology, first raised by scepticism, are critically analysed, and an evaluation is then made of the relatively recent efforts to discredit the discipline altogether. As this critique unfolds, it exposes an agenda that goes deep into the heart of Occidental<sup>6</sup> philosophy: the crusade to eliminate all vestiges of metaphysics from the scientific enterprise and to arrogate to the latter the status of omniscience. It was based on the endeavour by the various strains of positivism to reduce knowledge to the empirico-logical method, so that science could become a self-justifying process. Out of this campaign emerged the notion of the neutrality of science. The validity of the neutrality thesis is

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<sup>6</sup> I use the term ‘Occident’ to designate the comity of countries of Western Europe (and North America) whose intellectual lineage can be traced back to Greek philosophy and culture (see Comte 1908; Rappoport 1912).



examined in Section 5 and its claims are repudiated to reveal that science will always remain a discipline embedded in metaphysics.

After concluding, I introduce the reader to the next part of this study (to be published separately) where issues raised in this paper are contextualised for economics. I will show how the discipline succumbed to the pressures of positivism and embraced the idea of scientification, the consequences of which were far-reaching. IE then became deeply implicated in this influence when it imitated the methodology of ME. All of these issues will be extensively detailed in the follow-on paper.

### **3. Epistemology: Definition, Need and Significance**

Along with metaphysics/ontology,<sup>7</sup> logic<sup>8</sup> and ethics,<sup>9</sup> epistemology is considered among the most distinguished branches of philosophical enquiry. Etymologically, it is derived from the Greek words *epistēmē* (“knowledge”) and *logos* (“reason”) and is simply described as the theory of knowledge (Edwards 1967; Bartley 1987).

This narrow definition, however, does not convey the comprehensive character of the field. Epistemology critically examines the justification of knowledge claims, their sources and means of derivation, and the mechanisms and processes through which they are conveyed. Its task, accordingly, is (a) to interrogate the building blocks of knowledge, that is, to examine the concepts that form the basis of any scientific enquiry and how they were arrived at, (b) to explore how they functionally relate to one another within and across domains, (c) to seek criteria by which knowledge is justified, and, finally, (d) to specify the limits to what is humanly knowable. Additionally, its role is to clarify the similarities and/or differences between the supposed dichotomies of the objective-subjective, positive-normative and factual-hypothetical structures and ideas (Vollmer 1987).

If epistemology is to address human thought at such an elemental and foundational level, then its connection to other areas in philosophy is inextricable. Views about the essential nature of reality (metaphysics or ontology), of which humankind is a part, will unavoidably influence perceptions concerning human ability or otherwise to understand that reality. How man then expresses and conveys this meaning, and acts upon it, leads him into the field of semantics<sup>10</sup> and

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<sup>7</sup> A study of the ultimate structure and constitution of reality (as opposed to appearance) (Encyclopaedia Britannica 2010).

<sup>8</sup> The study of correct reasoning, especially as it involves the drawing of inferences (Ibid).

<sup>9</sup> A part of moral philosophy that seeks to determine the correct application of notions such as good and bad, and right and wrong (Ibid).

<sup>10</sup> A branch of philosophy dedicated to the study of language as a representation of reality (Ibid).

ethics respectively. If we affirm the presence of epistemic concepts of interaction — learning, discovery, growth and so forth — then endogeneity and the reciprocity of all of these areas of enquiry within human experience become well established. With the specialisation of knowledge and its subsequent professionalisation into formal disciplinary structures (see Wallerstein 1996), philosophers and practitioners of the different sciences may each wish to claim an epistemology that is distinct and, in some ways, exclusive to their discipline.<sup>11</sup>

Given this rich and all-embracing purview of epistemology, its implications for all socio-politico-scientific domains are far-reaching and profound. Not surprisingly, contemplation on epistemological questions has, since time immemorial, captured the minds of great thinkers in all civilizations. This incessant quest of humankind to discover the fundamental truths of their being and of the universe around them stems from an inherent desire to move from conjectural states into ever-increasing degrees of certainty. Ultimately, it is driven by a need to find the meaning and purpose of human existence and the world it occupies. These insights then serve as a point of reference, an anchor as it were, to guide humanity towards purposive behaviour in relation to themselves and to all other entities within the diverse world systems that they may have the potential to relate to. From this perspective alone, one may readily recognise the vital role that epistemology plays in providing for humankind a platform upon which they are able to live a meaningful life in the world.

When the different areas of knowledge enquiry branched off during the 17<sup>th</sup> and 18<sup>th</sup> Centuries into distinct and formal disciplines (see Sarton 1924; Wallerstein 1996), there was a deeply held view that, for these sciences to gain legitimacy, they required a formal system of thought to enable their evaluation of all knowledge claims and propositions (Taylor 1995). Epistemology was the natural candidate to fill the niche and perform the evaluative role required. However, for epistemology to be elevated to this supra-scientific status — that is, as a meta-discipline — meant that it had to lay claim to an objective and universal set of epistemic principles and criteria that could serve as the definitive standard of truth. This conception of truth is the basis that the Foundationalists<sup>12</sup> have used to erect the entire edifice of justified human knowledge. Hence the metaphor of knowledge as a set of indubitable beliefs that form the foundation upon which the superstructure of other propositions is built and justified (Papineau, 1981).

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<sup>11</sup> On this account, there could arise an epistemology of religion, an epistemology of the (natural) sciences, of economics and so on (Choudhury 2006a).

<sup>12</sup> Those who maintain that all knowledge and justified belief rest ultimately on a foundation of non-inferential knowledge or justified belief (Fumerton 2010).

## 4. The Attack on Epistemology

That epistemology is integral and indispensable to the construal of knowledge and the search for ultimate truth has been challenged, somewhat surprisingly, by both classical and modern philosophers and scientists alike. Starting with the ancient Greek sceptics of the Hellenistic tradition (see Palmer 2000), through to Hume (1739), Hegel (1977) Heidegger (1978), Boltzmann (1974) and Ayer (1936), and, more recently, Popper (1959), Quine (1969, 1981) and Rorty (1979), all of these scholars have questioned, to varying degrees, the validity of the traditional conception and role of epistemology. In some writings (e.g. Nielson 1991), the very legitimacy of the field has been abjured and even parodied.

What follows, at first, is an outline of the age-old contention of scepticism against the discipline and the counter-argument maintained in its defence. Proceeding from that is a discussion of the more recent critique that aims to strip epistemology of its pre-eminence and, perhaps more seriously, to repudiate the entire enterprise as a mistake altogether (Taylor 1995; see also McDermid, 2000).

### 4.1 The Sceptical Case

The classic argument against the very notion of a criterion of knowledge, first raised by early scepticism<sup>13</sup> and later, in the writings of Hume, Hegel and Boltzmann, is the apparent inability to prove unequivocally its universality and truth. This shortcoming leads to the “equipollence” problem that manifests itself in two interrelated ways.<sup>14</sup> Firstly, if a criterion (of truth) exists, then an alternative, contrary one may also be advanced with an equal weight of justification as the other. Secondly, if epistemology is to specify a criterion to validate knowledge claims, then that criterion itself would constitute a piece of knowledge (Vollmer, 1987) and also require justification. If another criterion (again, a piece of knowledge?) is to validate the earlier one, it would also have to be justified *ad infinitum*, so setting off an infinite regress. On this account, the dream of a first philosophy of knowledge becomes self-defeating and must be abandoned as it fails on its own terms. The lofty perch upon which epistemology rests crumbles from within.

Notwithstanding the logical validity<sup>15</sup> of the tropes of Agrippa used to buttress the equipollence problem, the following warrants careful consideration if we are to avoid the frustrating outcome that it leads to. In any reasoned discourse on epistemology, human

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<sup>13</sup> The Western philosophical school that adopted the attitude of doubting knowledge claims set forth in various areas (Encyclopaedia Britannica, 2010).

<sup>14</sup> These were originally referred to as the fourth and second tropes of Agrippa, respectively (Annas and Barnes, 2000; Forster, 1998).

<sup>15</sup> But not necessarily logically sound.

knowledge is both the subject and object of critique. Russell (1952) argued that for participants to engage in any kind of discourse there has to be at least some piece of knowledge that is shared between them and that no meaningful result is conceivable through engagement from a state of blank doubt. He thus warned against that strain of philosophy that leads to a destructive outcome of this sort. Consequently, it is impossible to place this knowledge-induced process outside the circle of knowledge and then, via it, to return to it.

What this means is that “epistemology does not prove the existence of knowledge, it presupposes knowledge” (Vollmer 1987). It need not endeavour to prove that knowledge can or does exist anymore than semantics presupposes language without aiming to prove that languages exist. Neither stands in need of proving their areas of study. Engaging in a dialogue on either is an implicit acknowledgement of the existence of its subject matter, at the very least. As Hegel (1904) also maintained, it is absurd for an investigation of knowledge to be conducted prior to knowledge. Consequently, even scepticism itself is not free of any “factual” content; it presupposes the scientific propositions of existence and requires them as a springboard to launch its arguments (Quine 1975).

## **4.2 The Self-sufficiency and Omnicompetence of Science**

Apart from the equipollence problem, there exists a more serious challenge to the traditional role of epistemology, as described earlier. It stems from the widely-held belief in both intellectual circles and the popular mind that the (natural) sciences presents to us a vision of the “world-as-it-is”, purified of bias and prejudice, and not encumbered with any preconceptions. Because the scientific enterprise presumably allows us to view the world not from within but “from some privileged, Archimedean vantage point situated somehow outside of, above, or beyond” ourselves (Friedman 1991:506; see also Nagel 1986), it transcends the strictures of philosophical thought. It is self-sufficient and autonomous, and therefore does not stand in need of epistemological judgement (see Feigl 1954).

### **4.2.1 The Argument and Historical Origins of the Idea**

For a long time now, it has been unquestioningly accepted that science as a realm, in its search for truth, is impartial and ideologically neutral. Given this perception, it is claimed to be objective, universal, and indisputable to the “naked facts” it presents; that its methodological apparatus is, likewise, completely invariant to the results obtained (see Agazzi 2014). It has no hidden agenda and is not driven by sinister forces; it is completely transparent, value-free and uncommitted to any particular dogma. Consequently, the scientific method is able to arrive

uniquely at knowledge that satisfies all the criteria of objectivity and universal validity (see Brownhill 1983). The recent spectacular successes that science has achieved, through its application of technology, has only served to strengthen this conviction in the positivity of scientific knowledge. That it has been wholly embraced by almost all nations across the globe attests to its universal acceptance.

Given this high pedestal of science, why then should it be accountable to any epistemic criteria, founded on some narrow set of metaphysical claims about knowledge and reality? Furthermore, why should it have to justify its assertions and outcomes when it is, in fact, able to transcend the limiting boundaries of epistemic reflections? Is its delivery to the world of extraordinary benefits — evidenced by quantum improvements in living conditions, *perhaps* unprecedented throughout history — not indicative enough of the final ascendancy of this greatness of human knowledge? These arguments constituted a profound challenge to the epistemologists who hitherto assumed that they were the gatekeepers of all knowledge claims. Of even greater significance, what role might there be, if at all, for Divine Revelation, in the face of these bold declarations?

This faith in the omnicompetence and objectivity of science marks a watershed, for scientific enquiry was previously never considered as being metaphysically neutral or impervious to contextual influences. It was always conceived as a social construct that reflected the religio-politico climate and ethos of the time, and was invariably influenced by its practitioners and those that patronised scientific learning (see Williams 2000). It is therefore not uncommon to encounter works on “Classical” science (see Spengler 1918) “Medieval” science (see Grant 1974), “Chinese” science (see Nakayama & Sivin 1973), “early Islamic” science (see Saliba 2007), etc., all of which were inextricably linked to the historical settings in which they were nurtured and, admittedly, supported by vested political interests, among other determining influences.<sup>16</sup> These earlier conceptions of science thus bring into sharp focus the basis for the pretensions of modernist science that it is apolitical, ideologically non-aligned, and free of any metaphysical connotations. How did it achieve this state of purported purity?

The notion that the scientific enterprise can, and ought to be, metaphysically free and therefore universally generalisable was first popularised by Francis Bacon,<sup>17</sup> when he called for the mind to be free from all theoretical preconceptions i.e. cleared of all “idols” (Bacon 1620). The highly

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<sup>16</sup> This proclivity of the powerful to fund scientific enquiry, and thereby influence its outcomes, should come as no surprise. If science is indeed an expression of the dominant ideas of a period, then as Marx (1970) poignantly remarked, the ruling ideas in every epoch are the ideas of its ruling class.

<sup>17</sup> A 17<sup>th</sup> Century philosopher frequently considered the Father of the Modern Scientific method.

contested religio-scientific debates at the time lent support to this ideal of crafting science as an “objective” enterprise. To prevent a recurrence of the kind of controversies reminiscent of the Bruno and Galileo Affairs<sup>18</sup> (see Yates 1964; Finocchiaro 1989), there was an attempt to clearly demarcate the boundary between metaphysics and the sciences (Toulmin 1990; Dorato 2010). Henceforth, all metaphysical claims were deemed to belong to the religious sphere, while the discovery of knowledge through rational means was reserved for science. On this view, faith and reason in the Judeo-Christian world would be better served if neither transgressed into the domain of the other.<sup>19</sup>

Due to this continuing schism in the *a priori* and *a posteriori* modes of reasoning during the Enlightenment (see Kant 1929; Mahomedy 2015b), religion and science lost the complementary relationship they previously shared. As the common ground between them contracted, whatever links were forged between the two weakened and eventually snapped (Perry 2010). The scientific quest subsequently adopted a distinctly anti-religious flavour when Comte extended his Positivist philosophy into the “social universe”, asserting that positivist science and its methodology could ultimately explain all phenomena, including human behaviour (Comte 1908, Kincaid 1998). That religion might play any significant role in the secular activities of people was by this time completely overshadowed by the ascending role assigned to science. Science was rapidly morphing into an ideology of Scientism (see Hayek 1952; D’Holbach 2001).

#### **4.2.2 The Rise and Fall of Logical Positivism<sup>20</sup>**

In the first few decades of the last century, the logical positivists (logical empiricists), who were the intellectual successors to the positivists, inherited the project to eradicate the scientific enterprise of *a priori*/metaphysical notions. Inspired by Whitehead and Russell (1910), and Wittgenstein (1922),<sup>21</sup> they were driven by a “fanatical ... belief that their approach constituted the sole and ultimate end of philosophical analysis” (Caldwell 1980:56). They circumscribed knowledge to only that which is empirically testable and verifiable through observational evidence. “Neatness and clarity”, the rejection of “dark distances”, “surface everywhere and no depths” became the credo of the rising movement (Neurath et.al 1929:5). Science was to be purified of all concepts that were not readily amenable to the immediately given data of sense

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<sup>18</sup> These marked the first major public disputes in the conflict between the claims of scientific learning vis-à-vis religious dogma (e.g. Gilson 1938, 1955; Grant 1977, 1974; Pieper 2001; Perry 2010; see also Mahomedy 2015a).

<sup>19</sup> More recently, this non-interaction between the two realms of enquiry has been articulated by Gould (2002) as respecting the principle of *non-overlapping magisteria* (NOMA).

<sup>20</sup> Considered by Hollis & Nell (1975) to be the most forceful and elegant form of positivism.

<sup>21</sup> Interestingly enough, both Whitehead and Wittgenstein subsequently revised their earlier positions quite radically in their later writings (see Whitehead 1925; Wittgenstein 1969).

experience. In this relentless crusade, the search for any reality beyond the perceptible world was crudely derided as “the production of nonsense” (Ayer 1936:14).

With this resolute objective in mind, a key thread that runs throughout the logical positivists’ writings, starting from the Vienna Circle and as it later evolved during its heyday, was its emphasis on observability and the reduction of data to the physical realm only. The neo-positivists exerted great efforts in first articulating a worldview based exclusively on logical and mathematical reasoning, combined with a judicious study of nature (see e.g. Carnap 1967; Neurath & Cohen 1973). To operationalise this worldview within science, they then extended their empirico-logical methodology to every branch of knowledge, including the social sciences. They effectively reduced science to the language of mathematics and physics (Carnap 1938, 1981; Neurath 1970; Hanfling 1981). In “their anxiety to annihilate metaphysics” (Popper 1959:36, see also Whiteley 1959), the logical positivists cast into the epistemic dustbin all statements that could not be empirically verifiable or confirmable. These included value judgments, ethical commitments, religious beliefs and emotional statements, since they thought that these constituted meaningless utterances lacking factual content.

The positivists expected that, through this process of reducing all knowledge to physicalism, the need for traditional epistemology could finally be dispensed with (Quine 1969; Friedman 1991). That they managed to co-opt within their programme the social sciences, particularly economics, was a great feat, for the gulf between the domains of the natural and social sciences revealed a history of continual and intense dispute (see Snow 2001; Berlin 2001; Mahomedy 2015b). With these developments in mind, was science finally reaching the culmination of efforts made by the greatest minds from the Occidental world, scholars who had been searching for the indubitable foundations of knowledge for centuries? That this Holy Grail was to be found not through traditional epistemology but through the indisputable, hard facts of the physical sciences? Lastly, was this development not the fulfilment of Comte’s prediction that in the final stage of the knowledge process, religion would be dethroned and replaced with the scientific enterprise (Comte 1853)?

During the middle of the last century, however, as the founding principles of logical positivism (LP henceforth) were being scrutinised, they started to reveal deep cracks and incoherencies (see Suppe 1974, 2000). And thus began an avalanche of devastating critique against the movement from both within (see e.g. Hempel 1950, 1951, 1974) and without (Quine 1951, Hanson 1958; Popper 1959; Kuhn 1962). The fundamental paradox was that several of its

key tenets were failing on its own terms: the analytic/synthetic distinction, the observation/theory division and, particularly, the verifiability criterion that was so carefully forged all along. All of these were contested and shown to be untenable. The logical positivists were being increasingly forced to admit that the enterprise was self-refuting and collapsing in upon itself. Ultimately, at a major symposium of its leading scholars and adherents in 1969, consequent to the unexpected defection of one of its key protagonists at the time, Carl Hempel (Suppe 2000), the movement experienced “a rather spectacular crash” (Van Fraassen 1980:2).

In the aftermath of the “near complete collapse of positivism”, there was no dominant philosophy of science to replace it and thereby guide scientific research (Cottingham 2014: 36; Tebes 2005). A severe crisis unfolded in its wake (Sheehan 2007; Agassi 2009), whose implications were perhaps not fully anticipated at the time. It unleashed a radical movement, broadly clustered under the rubric of the “post-modernist/social constructivist” philosophy. The central argument that filters through from this genre of writings (Rosenau 1992; Kukla 2000) is that there is no objective truth “out there”, waiting to be discovered. All that we attest to, or claim to represent as factual, is almost entirely the product of the social milieu and cultural environment in which we live (Knorr-Cetina 1981; 1999) and it is governed ultimately by the hegemony of power structures and the nexus of relationships that are inherent within them (Foucault 1980).<sup>22</sup> The critique was so extensive that nothing — not even human language, thought, rationality, and reason — escaped its onslaught (see MacIntyre 1988; El-Mesawi 2007).<sup>23</sup>

In this light, could there remain any meaningful role for epistemology within this relativist and anti-realist temperament that gripped the academe at the time (see Nola 1988)? In addition, how was science itself expected to proceed heretofore, especially after the demise of LP? Could it still claim any semblance of objectivity and neutrality, and furthermore provide justification for its claims within the strictures of *any* epistemological paradigm at all?

### **4.2.3 Naturalising Epistemology**

In response not only to the failure of positivism and all of its variants to supplant traditional epistemology with a structured form of empiricism, but also to the ensuing emergence of post-modernist thought, an alternative approach to demarcate the relationship between science and epistemology rapidly emerged and is presently gaining currency in epistemic circles (Kitcher

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<sup>22</sup> On this account, it is then quite easy to account for the phenomenal success of modernist science vis-à-vis technology. It reflects the supreme value that contemporary society attaches to material progress, whatever its ramifications on the other aspects or dimensions of human living vis-à-vis moral and ethical values, social cohesion, environmental degradation, etc.

<sup>23</sup> Undoubtedly, it was Feyerabend’s *Against Method* (1975) that epitomised calls for methodological pluralism in research, which sparked a fierce debate in scientific community.



1992; Kertész 2002; Crowley 2005). It is based on the works of Dewey (1903), Heidegger (1978) and Quine (1969, 1981), all of whom have rejected the notion of a strict dichotomy between the human mind and the world it seeks to understand.

These scholars contend that human conception of an object derives from the interaction and engagement between the mind and the object, mediated accordingly through our senses (Quine, 1969). But the knowledge gained, however, is neither static nor fixed. It is provisional and arbitrary, and subject to constant transformation and re-conceptualisation iteratively, as encounters between subject and object occur in different experiential contexts (Dewey, 1903). Simply, the external world *as it is* out there cannot be objectively attested to outside of human cognition. This implies that there can be no *a priori*, permanent, or infallible beliefs about anything at all. Within the context of this conception of reality and the fluid nature of our knowledge thereof, what becomes of the status of epistemology? In this scheme, epistemology is effectively stripped of its normative elements and its role, at best, limited to that of a *descriptive* discipline only (Kim 1993).

A “naturalised” epistemology of this sort, especially of the form<sup>24</sup> advocated by its leading proponent, Quine (1969), loses its primacy and propaedeutic role among the sciences. Quine (1981:72) is quite categorical about this — natural science, he argues, is “not answerable to any supra-scientific tribunal, and not in need of any justification beyond observation and the hypothetico-deductive method”. Science, accordingly, is a self-justifying process to be left unfettered by any supposedly, higher *a priori* criteria (McEvoy 2002). While Quine does not call for the outright banishment of epistemology, as demanded by Nielson (1991), he is willing to endorse a role for the discipline, but only on an equal footing alongside the other sciences, so that it serves the function of merely describing *how* we arrive at knowledge.

However, with this diminution of the discipline, in which its *a priori* content is expunged, could it still serve the epistemological purpose? Several of those opposed to this re-characterisation, such as Kim (1993), Bonjour (1998) and Putnam (2004), argue that naturalised epistemology, in emptying itself of its *aprioritic* assertions, will become devoid of any usefulness for epistemic purposes (see also McEvoy 2002). The central thrust of their defence of traditional epistemology is that the ideas of truth, justification and reliability are integral to the epistemological enterprise and is, in fact, its *raison d'être*. Shorn of any normative content, it

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<sup>24</sup> For other variants, see Feldman (2001).

loses its theoretical anchor and consequently cannot conceivably fulfil its objective. At best, it is positivist in character, merely uncovering how we arrive at our beliefs.

Quine and his adherents (e.g. Papineau 1981) deny that their project is indiscriminately descriptive. But if there are no *a priori* epistemic principles to guide scientific enquiry, how would justifiable and valid knowledge claims be distinguished from dubious ones? As a “technology of truth-seeking”, in the sense that Quine (1990:229) conceives it, naturalised epistemology would, they contend, still be well positioned to discount assertions made by occultists, soothsayers, telepathists and the like. To perform this evaluative task and thus still serve many of the functions of traditional epistemology, it would draw upon the diverse sciences of psychology, neurology, and physics (Quine 1986). Effectively then, what is really proposed here is a reversal of the roles of epistemology as a discipline and the other sciences.<sup>25</sup> The natural sciences will determine the avenues conducive for knowledge acquisition and truth seeking from those that are to be discredited.

But as Woods (1989:617-618) gathers, this treatment of epistemology “is hardly more than positivism stripped down and retrofitted ... without the trimmings ... and no retreat to first principles”. In essence, therefore, it still reflects the view that science, and science alone, with its empirical method, should serve as the ultimate arbiter of knowledge claims. It is, one might say, an attempt to reassert the primacy of natural science above any other conception of knowledge (Quine 1981, 1995). This, in itself, constitutes an untested and logically unproven *belief* in naturalism,<sup>26</sup> regarding which Husserl (1935:3) wrote:

Blinded by naturalism, the practitioners of humanistic science have completely neglected even to pose the problem of a universal and pure science of the spirit and to seek a theory of the essence of spirit as spirit, a theory that pursues what is unconditionally universal in the spiritual order with its own elements and its own laws. Yet this last should be done with a view to gaining thereby scientific explanations in an absolutely conclusive sense.

To summarise this section, one is led to conclude that, from the sceptics and early empiricists (à la Hume) to those who succeeded them (à la logical positivists) and the naturalists (à la Quine), the attack on the traditional role of epistemology had never really abated, even after the official collapse of positivism.<sup>27</sup> Similar arguments against the discipline that are not considered in detail here, as they broadly tend to weave around the same themes, can also be found in the writings of

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<sup>25</sup> In a sense, as acknowledged by Papineau (1981), it may amount to placing the cart before the horse.

<sup>26</sup> Giere (1985) argues that such a belief is logically untenable because the process of empirically evaluating criteria used in scientific investigation presupposes those very criteria, leading once gain to a paradox and the problem of circularity.

<sup>27</sup> Suppe (2000) marks this date as the 26 March 1969.

epistemological relativists such as Campbell (1974)<sup>28</sup>, the (pan)critical rationalists e.g. Popper and Bartley (see Bartley 1982), and (neo)pragmatists such as Rorty (1979).<sup>29</sup> While each of these positions tends to accentuate some aspects of the critique and attenuate others, the central thesis that binds them together on this issue can be discerned: the denunciation and repudiation, in varying degrees, of any form of commitment to *apriorism* in scientific thought, and henceforward, the denial of any meaningful role for epistemology.

The scientific enterprise, it is argued by them all, should not be encumbered with any form of externally imposed (i.e. presupposed) principles or antecedent commitments relating either to its content or methodology. Science therefore, should purge itself of all *a priori* and/or metaphysical notions (Feigl 1954; Zahar 1977). However, it should be asked whether it is practically viable or even logically possible for scientific enquiry to be categorically free of any assumptions or preconceptions, to be released *tout court* from any of its epistemological moorings and, in the tradition of Locke (1690), to proceed *tabula rasa*. It is to this issue that I now turn to.

## **5. Can Science be Free of Metaphysics and *A priori* Presuppositions?**

The demand for the scientific enterprise, particularly the social sciences, to be disentangled from any prescriptive values was forcefully articulated by Weber (1917) early in the 20<sup>th</sup> Century (see also Ravetz 1971; Putnam 2002), although this argument for an ethically-neutral science was not original. Hume (1739), almost 200 years prior to Weber, had exhorted the strict separation between the descriptive (the “*is/is not*”) and the prescriptive (“*ought/ought not*”). This Humean fork has formed the basis ever since for those who have motivated for a sharp distinction to be made between the positive and the normative in scientific enquiry (see, e.g., Robbins 1935).

### **5.1 The Neutrality Thesis Challenged**

It was from these ideas that a belief took hold that science can, and should, offer humanity a purist view of the world that is metaphysically free and ideologically uncommitted. This conviction in the apparent value-neutrality of science and the omniscience of the scientific method is still deeply held by many scientists, including economists, and the wider public in general. This neutrality thesis, however, has not gone unchallenged. Spengler (1918), Burt (1924/1932), Whitehead (1925), Collingwood (1940), Guénon (1953) and Yates (1964) had all expounded on the deep metaphysical foundations of even the modern physical sciences. There were yet others in between, such as Quine (1951), Hanson (1958), Popper (1959) and Whiteley

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<sup>28</sup> See also McKelvy (1999).

<sup>29</sup> One may also, in this context, mention the works of the post-modernists/post-structuralists, e.g. Derrida (1973) and Foucault (1980), but these are of a different genre altogether.

(1959) who also contributed in important ways towards dispelling the notion that science could be free of any dogma whatsoever.

But there is no doubt that it was Kuhn's and Feyerabend's celebrated publications, *The Structure of Scientific Revolutions* (1962) and *Against Method* (1975), respectively, that popularised the fact that any scientific investigation was unavoidably theory-laden and value-embedded. Their ideas served as the catalyst for the explosion in much of the post-modernist/social-constructivist critique of modernist science that soon followed (see Lyotard 1984; Knorr-Cetina 1981, 1999; Rosenau 1992). Subsequently, the notion of a value-free science, in both the natural and social sciences, has been hotly debated in the literature (Proctor 1991; Kincaid et.al 2007). These writings have now contributed towards dissipating, among philosophers of science at least, the impression that science provides us with an aperspectival and neutral view of the world.

The credit, however, goes to both Kuhn (1962) and Lakatos (1978) for developing cogent theories explaining the interrelationship between the metaphysical and empirical contents of scientific activity. Kuhn's (1962) work brought to the fore, among other ideas, that normal work-a-day scientific practice occurs within a given set of presumptions that provides a framework for the community of scientists within which they undertake their research and make discoveries. These presuppositions that cohere and form a *paradigm*, as it were, are for the most part rarely examined by the practising scientists themselves. It is only when the paradigm is unable to account for a significant number of anomalous results, i.e. new phenomena are no longer able to be explained by or within the current framework, that a crisis ensues which forces scientists to interrogate the underpinnings of the framework. In this process, the old paradigm may be replaced with a rival and newly emergent one, leading to what Kuhn calls a *scientific revolution*.

In another major contribution in this area, Lakatos (1978) developed a theory of Scientific Research Programmes (SRP) similar, though different in significant ways, to that of his contemporary and rival, Kuhn. In it, he also argued that all research programmes were characterised by a set of theories that adhered to an ensemble of beliefs, which he referred to as a "heuristic" (Lakatos 1978:48). The hard core of the scientific programme consisted of a set of axioms and beliefs called the *negative* heuristic, which was then surrounded by a protective belt of related beliefs and auxiliary hypotheses that formed the *positive* heuristic. The negative heuristic, during the lifetime of the SRP, was never interfered with nor altered. On the other hand, the positive heuristic could be modified, adjusted, readjusted, and completely replaced, if

it had to, in order to defend the hard core. Most tellingly, Lakatos asserts, the basic propositions of the hard core were accepted without question and considered “irrefutable” by those who were committed to it (Lakatos 1978:50). They could be abandoned only when a programme reached a degenerative stage, after which the hard core was replaced by another one developed independently of its predecessor.

The crucial contribution of both Kuhn and Lakatos was that they utterly exposed the canard that science was free of any *aprioristic* assumptions. They demonstrated persuasively why some commitment to an *untested* set of metaphysical beliefs was inescapable, for without it, Kuhn (1962:42) argued, “no man would be a scientist”. Why this imperative exists is explained below.

## 5.2 The Essence and Necessity of Presuppositions

Presuppositions, by their very nature, are commitments that we must make *before* undertaking any cognitive activity. They provide (and colour) the lenses through which we envision reality by imposing certain structures (categories) of perception on the world (see Berlin 1978; Holtzman 2003). For example, our (one or more) beliefs *ex ante* that the world exists physically, that objects have substance, that events have causes, that humans have individual consciousness, that people are able to think logically, that actions have ethical dimensions, that principles and values may be legitimate or not, etc. all imply the conceptual categories of time, space, mass, property, causation, self, rationality, normativity, truth and falsehood, etc. Beliefs thus bind a person to certain categories, all of which cohere together to form his or her worldview about life and existence. From there on, all thinking is shaped by this conceptual scheme so that we search for, make sense of, configure, and evaluate the world and reality in terms of its categories *ex post*. As Einstein (1916:102) recalled, these categorical commitments wield

such an authority over us that we forget their earthly origins and accept them as unalterable givens. Thus they come to be stamped as “necessities of thought,” “a priori givens”.

The defining characteristic of those presuppositions that constitute an intellectual framework is that they are *not* the result of empirical discoveries or any truth-claims formulated within science (Holtzman 2003, Dilworth 2007). Furthermore, and surprisingly to many, they are never verifiable or falsifiable with the scientific method (Whiteley 1959; Holton 1973).<sup>30</sup> Axioms are therefore extraneous to the scientific enterprise *per se*, yet they provide for science the basic categories that coalesce to form a framework within which scientific activity may be conducted.<sup>31</sup>

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<sup>30</sup> The fecundity or dearth of empirical observations relating to these axioms, however, may increase our personal conviction or doubts about them, respectively.

<sup>31</sup> The key metaphysical assumptions of modernist science have been extensively detailed by Burt (1924/1932) in his *The Metaphysical Foundations of Modern Science* and Whitehead (1925) in his *Science and the Modern World*. For a more recent

These categorical presuppositions govern all aspects of the enterprise, to the extent that they “practically recolour(ed) our mentality” (Whitehead 1925:2) and become “the final controlling factor in all thinking whatever” (Burt 1924:17). Consequently, they pervade all aspects of the scientific culture within which they emerge and embed themselves.

That we can only think <sup>32</sup> within *some* framework possessing an underlying set of preconceptions is acknowledged by even those who reject the traditional function served by epistemology, such as Quine (1960) and Popper (1970). The latter was even more forthright when he conceded: “I do admit that at any moment we are prisoners caught in the framework of our theories; our expectations; our past experiences; our language” (Popper 1970:56). In this, Popper, like Wittgenstein (1969) before him, recognised that human thought within some paradigmatic structure is inevitable. Hanson (1958) went so far as to suggest that even our casual and mundane acts of sensory perception, such as sight, are not neutral and objective; they are as much influenced and shaped by “the background knowledge we bring to the perceptual context” (Bechtel 2013).

Subsequent to the above contributions in the philosophy of science, it started to become increasingly clear that the adoption of at least some presuppositions or metaphysical assumptions in scientific discourse could not be avoided, as any cognition by means of scientific concepts and precepts invariably hinged on such presuppositions (Collingwood 1940; Popper 1972; Hübner 1988). Without them, on what basis would a scientist demarcate a field of enquiry from the mass of perceptions impinging upon the senses, where would it begin within a particular area and how could it be determined whether any investigation *ab initio* was warranted at all? The later Wittgenstein,<sup>33</sup> in his *On Certainty* (1969), resigned himself to this denouement by asking:

Must I not begin to trust somewhere? ... somewhere I must begin with not-doubting (150) ... The *questions* we raise and our *doubts* depend on the fact that some propositions are exempt from doubt (341, i.i.o) ... Whenever we test anything, we are already presupposing something that is not tested (163) ... At the foundation of well-founded belief lies belief that is not founded (253).

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treatment, see Dilworth’s (2007) *The Metaphysics of Science: An Account of Modern Science in Terms of Principles, Laws and Theories*.

<sup>32</sup> MacIntyre (1986:4) asserts that even rationality itself “is inescapably historically and socially context-bound”.

<sup>33</sup> As compared to his earlier (1922) writings.

### 5.3 Why Presuppositions Go Undetected

Given the primal role of these “thought-frameworks”, why are their presumptions so seldom acknowledged and readily taken as incontrovertible?<sup>34</sup> There are two interrelated reasons for this. Firstly, at this level of analysis, a clear overlap and intersection exists between ontological assumptions,<sup>35</sup> epistemological concerns, and methodological issues.<sup>36</sup> If we did not believe that something existed, it would not strike us as being a worthwhile pursuit to gain knowledge of it and we would not care to formulate the appropriate means to do so.<sup>37</sup> As outlined earlier, positivist/modernist science sought to expunge metaphysics from its repertoire of “meaningful” concepts. If any notion could not be operationally defined or, at the very least, did not have any observable implications, then any attempt to describe it was rejected as “the production of nonsense” (Ayer 1936:14). Given such an uncompromising stance towards the metaphysical, ontology — or the question of being — was altogether precluded from scientific discourse (Chmielecki 1998; Meador 2003) and hence any deliberation on these issues was dismissed as being a waste of time.

Secondly, despite the disavowal and hostility of modernist science towards the metaphysical, contemplation on these issues is irresistibly forced upon scientists during periods of intellectual crises. But the history of science records that scientific revolutions, à la Kuhn, or, programme degeneration, à la Lakatos, during which these foundational propositions are re-examined, do not occur frequently. It may take centuries or even millennia for a new paradigm to emerge and overthrow an older one: Copernican heliocentricism in cosmology and quantum mechanics in physics are cases in point. This further explains why the presuppositions that undergird scientific thinking in any milieu are rarely interrogated: practitioners and the broader public may never *experience* the need to question them in their lifetimes. In addition, it is conceivable that when an older paradigm is replaced, not all of its presuppositions are abandoned *in toto*. Some may be incorporated into the new paradigm and persist within scientific thinking for years to come.

The above section serves to highlight several important issues: firstly, to debunk the notion that modernist science provides us with a neutral or purist view of the world that is devoid of any

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<sup>34</sup> It is only when one experiences a severe intellectual crisis of perhaps existential proportions that one feels compelled by *oneself* to re-examine one’s hitherto unquestioned assumptions of thought and praxis. The celebrated examples of those who experienced this in the Western world included Descartes (1596–1650, cf. Descartes 1985) and, much earlier in the Muslim world, al-Ghazali (1056–1111, cf. Hozien 2001).

<sup>35</sup> Ontology: the philosophical study of existence, or being (Craig, 1998).

<sup>36</sup> I.e. our conceptions about the nature and structure of the world impact on our quest to search for and discover that reality, and the means that we might adopt to gain that knowledge accordingly.

<sup>37</sup> Any of these as-yet unconceived entities, if ever “discovered”, will occur purely through accident and yet still necessitate some cognitive (re)orientation (Barnes 1982).

preconceptions (*a priori* notions), however much scientists may aspire for this ideal. Secondly, these presuppositions are integral to any scientific enquiry and invariably metaphysically located within some paradigm, which nonetheless can, under certain conditions, be revised or supplanted. Thirdly, these axioms that form the core of any scientific endeavour and that establish for it its conceptual paradigms (Smith 2006, Dilworth 2007) are rarely recognised as such, due to the aversion of positivist science towards any discourse on transcendental notions and concepts outside of itself.

## **6. Conclusion: Summary Remarks and the Need for Epistemology Reasserted**

The Islamisation of Knowledge sought to unite the body of knowledge in the various fields of human enquiry into a cohesive whole. As part of this project, Muslim economists transformed their discipline, hoping to provide to the Muslim world a conception of economic science that reflects an Islamic ethos. However, all is not well with Islamic economics (IE) and its most committed intellectuals and contributors have recognised that the project has stalled and in urgent need of revitalisation. Notwithstanding this candid acknowledgment, there is no consensus on how to revive the discipline.

One of the challenges identified quite early on by several proponents and critics alike is that IE lacks a well-articulated methodology to guide its research and practice. While Islamic economists are willing to concede that their difficulties *might* be methodological, they cannot agree on why their current approach has failed them. The dominant view among Islamic economists is that scientific methodology is a neutral process and hence cannot be the source of the problem. Due to this belief in the inherent neutrality of science, they have largely ignored epistemic concerns that have been raised by others, arguing that these concerns have no relevance for IE. Consequently, deep divisions on this issue are now hindering any further development of the discipline. In seeking to unravel this conundrum, this study addressed the issue beyond the groundwork of methodology. It probed into the core of the relationship between epistemology, science, and economics in order to identify whether the difficulty and confusion stemmed from within this nexus. Thus far, several important findings have surfaced from the investigation.

Throughout ancient and medieval history, epistemology has always played a key role in guiding scientific enquiry. It evaluated and provided justification for the claims of validity asserted by the different branches of knowledge. This connection endured, despite objections raised by scepticism. The Scientific Revolution, however, pursuant to the fall-out from the



tenuous relationship that existed between the Church and leading scientists, overturned this apodictic relationship. From Bacon and Galileo to Hume and Comte, the view took hold that scientific learning was to be circumscribed to the observable and that all metaphysical and *a priori* claims, if at all admissible, should be confined to the realms of religion. This attitude eventually metastasised into a movement that aimed to banish metaphysics altogether, reaching its apogee in the positivist crusade of the last two centuries. Given the normative nature of epistemology, its role within the knowledge enterprise was increasingly questioned and, at times, mistrusted. Many derided it as a completely irrelevant discipline.

The attack on traditional epistemology was accompanied by a corresponding belief in the objectivity and omniscience of science. The spectacular results achieved from the widespread application of scientific learning to technological improvements reinforced the impression that modern science was universally embraced and trusted by everyone and that all nations of the world accepted its claim to yield indubitable results.<sup>38</sup> From this emerged the misconception that the natural sciences, in particular, were value-neutral and “pure in themselves”. This was based on the fundamental proposition that modern science was presuppositionless and that its only distinction was its empirical method. The neutrality thesis of science was thus borne, and with it a growing confidence in its capacity to solve all of the key problems of humanity. As these notions gained traction in both the academic world and mainstream media, few bothered to question any of its hubristic assertions. The Nobel laureate in Economics, Hayek (1952:15), appropriately referred to this newly emerging ideology as the folly of “scientism or the ‘scientific’ prejudice”.

It was against this background that the logical positivist movement arose to prominence during the first half of the last century. It marked perhaps the most ambitious drive ever to terminate, once and for all, all philosophical speculation in science. Its protagonists set out, through a concerted effort, to reduce every (legitimate) branch of knowledge to the language of mathematics and physics. All claims to truth had to satisfy the criterion of verifiability, or else they were condemned as meaningless utterances. The aim of LP, then, was to limit knowledge to the incontestably sensate world so that science could become a self-justifying enterprise. In consequence, epistemology fell to the wayside and the quest for epistemic certainty “was seen as a lost cause” and eventually abandoned (Quine 1969:294). The relationship between epistemology and science was finally severed.

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<sup>38</sup> See also Ackoff (1993).

However, barely a few decades had passed when the positivist project started to flounder. One after the other, almost every one of its key propositions began to fail on its own terms. The neat distinctions that the positivists had set up to demarcate scientific propositions from non-scientific ones blurred so that ultimately they lost relevance for all intents and purposes. As the movement collapsed, post-modernist philosophy latched onto its failings to attack the entire edifice of the Enlightenment agenda. Reason and rationality, the very tools of scientific enquiry, came under heavy critique. Desperate to protect the integrity of science, Quine and others proposed a rehabilitated role for epistemology, although in its new formulation it was rendered to be largely descriptive and lacking any normative purpose. The vehement opposition to any form of *a priori* knowledge remained unshaken. And thus, although the positivist movement had died decades before, its spirit was alive and continued to lurk deep within the hallways of academia.

Despite this denial of the *a priori* by the scientific establishment, there was at the same time a growing realisation by many leading philosophers of science that scientific enquiry was by no means as neutral as people were (mis)led into believing. They discerned that even the natural sciences were metaphysically grounded and that any scientific activity was inevitably embedded within some set of *aprioristic* claims about reality. These philosophers-cum-scientists demonstrated both logically and historically why science could never stand its own ground and defend its claims by using arguments from within its field. It had to be undergirded, as always, by presuppositions or axioms that were extraneous to the scientific method. These axioms served as anchor points, or markers, as it were, that enabled scientific enquiry to proceed and authenticate its claims.

In a remarkable twist of irony, although modernist science had renounced metaphysics, recent scientific findings at the micro- and macro-scale of the universe compelled scientists to recognise and acknowledge their dependence on epistemic and ontological assumptions. Certain inexplicable phenomena<sup>39</sup> appeared that thoroughly puzzled the scientific community, forcing scientists to rethink their intellectual frameworks (see Capra 1982). These outcomes began to confirm the paradigmatic nature of scientific theorising and, equally important, highlighted our inability to fully explain phenomena and predict events. Scholars at the frontiers of research in cosmology and the physical sciences, such as Einstein, Bohr, Heisenberg, and Bohm, recognised the implications of these ground-breaking discoveries and exhorted a complete reintegration of epistemology into science (see Einstein 1916, 1949; Bohr 1958; Heisenberg 1971; Bohm 1994).

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<sup>39</sup> Such as “black holes” in outer space and the behaviour of sub-atomic particles.

Reflecting yet another paradox, while the physical sciences have been quite willing to recognise these inextricable links, the social sciences, which are more heavily implicated in these issues, have stubbornly resisted doing so. Economics, in particular, as alluded to below, has refused to countenance any critique of its underlying assumptions and continues to insist that they fall outside the purview of its field of enquiry.

## **7. A Brief Introduction to Part Two of the Study (to appear in the next edition of this series)**

The drive to extricate from within science all vestiges of *apriorism* has had a most discernible impact on the humanities. With the assertion that science could and should be objective, a new benchmark was set for all disciplines that sought to earn the respect and prestige already accorded to the natural sciences. The race was on among the various social sciences to ape the methodology of the “hard sciences” in order to achieve the status of a scientific discipline. Economics clearly led the pack, since from the early decades of the 19<sup>th</sup> Century, its leading scholars had already endeavoured to craft their field along positivistic lines. Not surprisingly, economics was soon crowned the “Queen of the Social Sciences” (see Mäki 2002:3).

Consequently, when LP set out to transform all branches of knowledge into a physico-mathematical language, it found a willing ally among the economists who needed a philosophical base to anchor their own programme of scientification. As the alliance grew, economic methodology became almost isomorphic with that of the natural sciences. In the process of “objectivising” economics, the discipline shut itself off from all of the other areas within the humanities with a “wall of rationality”, assuming that it could explain the ambit of its reality completely autonomously (Shackle 1978:4-6). Economics then declared itself a value-free and objective science, and henceforth considered any critique of its theoretical assumptions as an exercise in futility. All philosophical discussions were exorcised from the discipline. The implications of these developments were profound for both theoretical and applied economics.

When Muslim economists recognised that ethical neutrality was a *non sequitur* for any conception of (Islamic) economics, they attempted to infuse mainstream economics (ME) with the values of Islam. But like their counterparts, because they accepted the notion of science as an objective and ideologically-free enterprise, they uncritically adopted modern scientific methodology to undertake the process of Islamising economics. By neglecting the epistemic and ontological underpinnings of modernist science and its surrogate, neoclassical economics, Islamic economics (IE) has turned out to be almost indistinguishable in so many respects to

neoclassicism. It now faces the same difficulties as ME, such that the Islamic economists have openly acknowledged that something has gone awry with their project.

Given the above developments, one can clearly trace the challenges in IE to the indelible influence that positivism has had on both ME and IE, through its insistence on rendering scientific enquiry free of all *aprioristic* assertions. How this characterisation of modern science as an objective enterprise impressed itself upon economics is fully discussed in the next paper.

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