SPECIAL FEATURE ON
THE PHILOSOPHY OF SCIENCE OF
SYED MUHAMMAD NAQUIB AL-ATTAS

AL-ATTAS' PHILOSOPHY OF SCIENCE
AN EXTENDED OUTLINE

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Born on September 5, 1931, in Bogor, Java, Syed Muhammad Naquib bin Ali bin Abdullah bin Muhsin al-Attas has spent a lifetime in the pursuit of knowledge rooted in the traditional Islamic sciences. He is competent in diverse academic fields such as philosophy, metaphysics, Kalām, history and literature. He has developed a goal-oriented philosophy and methodology of education, to "Islamize the mind, body and soul" of the student. He extends this focus to its effects on the personal and collective lives of Muslims as well as others, including the spiritual and physical non-human environment. He has authored twenty-seven authoritative works on various aspects of Islamic thought and civilization, particularly on Sufism, cosmology, metaphysics, philosophy and Malay language and literature.

Al-Attas' family includes a long line of illustrious scholars and he received a thorough immersion in the traditional Islamic sciences. He also received a comprehensive education in Malay language, literature and culture. His formal primary education began at age five in Johor, Malaysia, but during the Japanese occupation of Malaysia, he went to a madrassah, al-ʿUrwatuʾl-Wuthqa, in Java where he learned Arabic. After World War II, he returned to Johor in 1946 to complete his secondary education. He was exposed to Malay literature, history, religion, and western English classics, and developed a keen aesthetic sensibility in a cultured social atmosphere. He developed an exquisite style and precise vocabulary that are unique to his Malay writings and language. After finishing secondary school in 1951, he entered the Malay Regiment as a cadet officer. Thereafter he was selected to study at Eton Hall, Chester, Wales and later at the Royal Military Academy, Sandhurst, England (1952-55). Here he gained insight into the spirit and style of British society. During this time he was drawn to the metaphysics of the Sufis, especially works of Nūr al-Dīn ʿAbd al-Raḥmān ibn Aḥmad al-Jāmī (1414-92), commonly called the last great classical poet of Persia, the celebrated saint and mystic whose works include Salaman and Absal *and* Lawaʾiḥ al-Durrah al-Fākhirah.

Al-Attas traveled widely. He was drawn especially to Spain and North Africa where Islamic heritage had a profound influence on him. Al-Attas felt the need to study, and voluntarily resigned from the King's Commission to serve in the Royal Malay Regiment, in order to pursue studies at the University of Malaya in Singapore 1957-59. While an undergraduate at University of Malaya, he wrote Rangkaian Rubāʿīyāt, *a literary work, and* Some Aspects of Sufism as Understood and Practised among the Malays. *He was awarded the Canada Council Fellowship for three years of study at the Institute of Islamic Studies at McGill University in Montreal. He received an M.A. degree with distinction in Islamic philosophy in 1962; his thesis was entitled "Raniri and the Wujudiyyah of 17th Century Acheh". Al-Attas went on to the School of Oriental and African*

Studies, University of London, where he worked with Professor A. J. Arberry of Cambridge and Dr. Martin Lings. His doctoral thesis (1962) was a two-volume work on the mysticism of Hamzah Fansuri.

In 1965, Dr. Al-Attas returned to Malaysia and became Head of the Division of Literature in the Department of Malay Studies at the University of Malaya, Kuala Lumpur. He was Dean of the Faculty of Arts from 1968-70. Thereafter he moved to the new National University of Malaysia as Head of the Department of Malay Language and Literature, and then Dean of the Faculty of Arts. He strongly advocated the use of Malay as the language of instruction at the university level, and proposed an integrated method of studying Malay language, literature and culture so that the role and influence of Islam and its relationship with other languages and cultures would be studied with clarity. He founded and directed the Institute of Malay Language, Literature and Culture (IBKKM) at the National University of Malaysia in 1973 to carry out his vision.

In 1987, Al-Attas became the University Professor of Islamic Thought and Civilization at the International Islamic University of Malaysia (IIUM). He is the Founder-Director of the International Institute of Islamic Thought and Civilization (ISTAC), Kuala Lumpur. Al-Attas envisioned the plan and design of every aspect of ISTAC, to the extent of incorporating Islamic artistic and architectural principles throughout the campus and grounds.

For details of his personal, academic and professional background, as well as his intellectual vision and achievements, see Wan Mohr Nor Wan Daud (1991), The Beacon on the Crest of a Hill: A Brief History and Philosophy of the International Institute of Islamic Thought and Civilization, ISTAC, Kuala Lumpur; The Educational Philosophy and Practice of Syed Muhammad Naquib al-Attas: An Exposition of the Original Concept of Islamization, ISTAC, Kuala Lumpur, pp. 1-31; and "Introduction" to (1994) Commemorative Volume on the Conferment of the Al-Ghazali Chair of Islamic Thought, ISTAC, Kuala Lumpur, pp. 1-14.

Selected Publications by Al-Attas

(1963), *Some Aspects of Ṣūfism as Practiced among the Malays*, Malaysian Sociological Research Institute, Singapore.

(1966), *Rānīrī and the Wujūdiyyah of 17th Century Acheh*, Malaysian Branch of the Royal Asiatic Society, no. 3, MBRAS, Singapore.

(1970), *The Mysticism of Ḥamzah Fanṣūrī*, University of Malaya Press, Kuala Lumpur.

(1978), *Islām and Secularism*, ABIM, Petaling Jaya; 2nd impression (1993), ISTAC, Kuala Lumpur.

(1981), *The Positive Aspects of Taṣawwuf: Preliminary Thoughts on an Islamic Philosophy of Science*, Islamic Academy of Science, Kuala Lumpur.

(1985), *Islām, Secularism and the Philosophy of the Future*, Mansell, London & New York.

(1986), *A Commentary on the Ḥujjat al-Ṣiddīq of Nūr al-Dīn al-Rānīrī: being an exposition of the salient points of distinction between the positions of the theologians, the philosophers, the Ṣūfīs and the pseudo-Ṣūfīs on the ontological relationship between God and the world and related questions*, Ministry of Culture, Kuala Lumpur.

(1989), *Islām and the Philosophy of Science*, ISTAC, Kuala Lumpur.

(1990), *The Intuition of Existence: A Fundamental Basis of Islamic Metaphysics*, ISTAC, Kuala Lumpur.

(1990), *The Nature of Man and the Psychology of the Human Soul: A Brief Outline and a Framework for an Islamic Psychology and Epistemology*, ISTAC, Kuala Lumpur.

(1991), *The Concept of Education in Islām: A Framework for an Islamic Philosophy of Education*, ISTAC, Kuala Lumpur.

(1994), *On Quiddity and Essence: An Outline of the Basic Structure of Reality in Islamic Metaphysics*, ISTAC, Kuala Lumpur.

(1995, 2002), *Prolegomena to the Metaphysics of Islām: An Exposition of the Fundamental Elements of the Worldview of Islām*, ISTAC, Kuala Lumpur.

(2001), *Risalah Untuk Kaum Muslimin* (*Message to the Muslims*), ISTAC, Kuala Lumpur.

This article presents an outline of Muhammad Naquib al-Attas' ontological, cosmological and epistemological premises underlying his philosophy of science, and goes on to aspects of methodology and axiology those premises entail. Frequent references are made to particular (mostly revisionist) western philosophies of science to further inform the discourse and draw attention to wider connections.

***Keywords*:** Islamization of knowledge; scientific probity of *taṣawwuf*, reason, intellect, and rationalism; empiricism; trans-empirical awareness; Unity of Existence; metaphysical vision of Truth and Reality; atomism; perpetual recurrence of creation; causality; divine self-disclosure; challenge of Western science; *tafsīr-ta'wīl* methodology; scientism.

Introduction

Syed Muhammad Naquib al-Attas' philosophy of science is expressed most systematically in his *The Positive Aspects of Taṣawwuf: Preliminary Thoughts on an Islamic Philosophy of Science*,[1] and *Islām and the Philosophy of Science*.[2] These two monographs fit within the larger intellectual context of his exposition on the 'Islamic Worldview' in his *Prolegomena to the Metaphysics of Islām: An Exposition of the Fundamental Elements of the Worldview of Islām*.[3] His conception of the 'Islamization of present-day knowledge' in *Islām and*

1. Henceforth *PAT*. This concise treatise of 13 pages was originally presented to the Festival of Zarrūq (Miḥrajān Zarrūq) in commemoration of the great North African Ṣūfī Aḥmad Zarrūq (1442-93), Miṣrātah, Libya, 16-20 June, 1980; ibid., footnote 13. The word "positive" in the title serves to emphasize that *taṣawwuf* as such is a completely positive intellectual and spiritual discipline since it is based on direct experience of ultimate reality (ibid., 1-2).
2. Henceforth *IPS*. Originally a keynote address presented to The International Seminar on Islamic Philosophy and Science, University of Science, Penang, Malaysia, 29 May-2 June, 1989. This concise treatise of 36 pages is an elaboration of *PAT*, in which some salient conceptual and methodological features of modern western science are also critically surveyed.
3. Henceforth *Prolegomena*, reference to 2nd edition. In this work, *IPS* constitutes chapter III of seven chapters with no substantial revision.

Secularism[4] provides a general analytical framework for contrasting the Islamic philosophy of science with various modern philosophies of science. The continuity between al-Attas' philosophy of science and the classical Islamic intellectual tradition lies in his critical adoption of Ghazālīan–Ibn al-ʿArabīan[5] ontology, cosmology, psychology and epistemology.[6]

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4. Henceforth *IS*; reference to 2nd impression. See also, respectively, ibid., xi, 45, and also idem, *The Concept of Education in Islām: A Framework for an Islamic Philosophy of Education* (1991) ISTAC, Kuala Lumpur, pp. 8, 43, henceforth *CEI*, for the alternative phrases "islamization of contemporary knowledge", "islamization of thought and reason", "islamization of the mind and of the vision of reality and truth as perceived by the mind" and "islamization of knowledge." Another version of the *IS*, incorporating two extra chapters on "The Positive Aspects of *Taṣawwuf*" and "The Concept of Education in Islām," was published as *Islām, Secularism and the Philosophy of the Future* (1985), Mansell, London & New York; henceforth *ISPF*. The ideas expressed by al-Attas in *PAT*, *IPS*, *IS*, *CEI*, *ISPF* and *Prolegomena* were already largely prefigured in a typed Malay manuscript, *Risalah Untuk Kaum Muslimin* (*Message to the Muslims*), dictated to his secretary in 1973, but only recently edited and published (2001), ISTAC, Kuala Lumpur, vii, henceforth *Risalah*; see also "Author's Note to the First Edition," in *IS*, ix.
5. A note about the name of Muḥyī al-Dīn Muḥammad ibn ʿAlī ibn al-ʿArabī: he is referred to as Ibn ʿArabī by some scholars, perhaps to distinguish him from the author of *Aḥkām al-Qurʾān*. This is also the spelling used by the Muhyiddin Ibn 'Arabi Society, but Shaikh al-Akbar refers to himself as Ibn al-ʿArabī. We have retained the "al" except for direct quotes.
6. PAT, pp. 10-11; *Prolegomena*, pp. 214-5; (1986), *A Commentary on the Ḥujjat al-Ṣiddīq of Nūr al-Dīn al-Rānīrī: being an exposition of the salient points of distinction between the positions of the theologians, the philosophers, the Ṣūfīs and the pseudo-Ṣūfīs on the ontological relationship between God and the world and related questions*, Ministry of Culture, Kuala Lumpur, especially pp. 29-46 and 455-65 and henceforth *Ḥujjat*; idem (1970), *The Mysticism of Ḥamzah Fanṣūrī* University of Malaya Press, Kuala Lumpur, especially pp. 66-110 and henceforth *Mysticism*; idem (1966), *Rānīrī and the Wujūdiyyah of 17th Century Acheh, Monographs of the Malaysian Branch of the Royal Asiatic Society*, no. 3 MBRAS, Singapore, especially pp. 18-56, henceforth *Rānīrī*; idem (1963), *Some Aspects of Ṣūfism as Practiced among the Malays*, Malaysian Sociological Research Institute, Singapore, especially pp. 10-20, henceforth *SAS*; idem (1990), *The Nature of Man and the Psychology of the Human Soul: A*

Al-Attas makes clear that his philosophy of science is constitutive of an integral network of interrelated intellectual preliminaries which have to be fully grasped in order to gain insight into the true nature of the challenge of modern western systems of knowledge to Islamic thought and civilization in the contemporary world.[7]

> Islamic science and philosophy (*i.e. ḥikmah* as contrasted with *falsafah*) have always found coherent expression within a basic metaphysical structure formulated according to the tradition of Ṣūfism and founded upon the authority of revelation, Tradition, sound reason, experience and intuition. Since the divergence between this Islamic metaphysics and modern science and philosophy is rooted in their respective positions concerning the sources and methods of knowledge and the epistemological process, we cannot afford to allow ourselves to submit to the dictates of the statements and general

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Brief Outline and a Framework for an Islamic Psychology and Epistemology, ISTAC, Kuala Lumpur, henceforth *Psychology*; idem (1990) *The Intuition of Existence: A Fundamental Basis of Islamic Metaphysics*, ISTAC, Kuala Lumpur; (1994), *On Quiddity and Essence: An Outline of the Basic Structure of Reality in Islamic Metaphysics* ISTAC, Kuala Lumpur; idem, *The Degrees of Existence*, ISTAC, Kuala Lumpur. The last four monographs are incorporated respectively as Chapters IV-VII of the *Prolegomena*, pp. 143-319. For a concise and accessible exposition of the metaphysical worldview of al-Attas and its sources, see also Wan Mohd Nor Wan Daud (1998), *The Educational Philosophy and Practise of Syed Muhammad Naquib al-Attas: An Exposition of the Original Concept of Islamization*, ISTAC, Kuala Lumpur, pp. 33-67 passim, in the context of this paper especially pp. 39-48, 49-54, 59-67, 377, 393, 413-4.

7. "Preface" to *ISPF*, pp. x-xii; *Prolegomena*, pp. 15-16; *IS*, Chapter IV on "The Muslim Dilemma," pp. 97-132, where on page 105, he said that the historical "confrontation" between Islam and the West "has now moved on to the intellectual level." See also *Risalah*, § 1:4-5, § 50-51:126-32; and al-Attas' important keynote address "The Worldview of Islām: An Outline" in (1996), *Islām and the Challenge of Modernity: Historical and Contemporary Contexts*, ISTAC, Kuala Lumpur, proceedings of the Inaugural Symposium organized and hosted by ISTAC in Kuala Lumpur, August 1-5, 1994, especially pp. 36-7 and 68-71, henceforth *ICM*; where he speaks about the need to break the intellectual spell of the secularizing process of Western philosophy, science, technology and ideology.

> conclusions of a science and the interpretations of a philosophy that both rely on restricted forms of empiricism and rationalism as sources and methods of genuine knowledge, seeing that the purpose of inquiry is to discover the truth about the ultimate Reality.[8]

Thus one fundamental requirement for approaching and understanding al-Attas' philosophy of science is a rejection or at least suspension of any demarcationism which a priorily excludes 'revelation' or any 'religious' truth-claims from coming within the ambit of valid rational and empirical inquiry.[9] It is implicit in al-Attas' conception of science as "definition of reality"[10] that 'science' is to be understood in the wide sense of the term as any objective systematic inquiry, including the intellectual, psychological, natural, social and historical disciplines. This understanding accords well with the traditional Islamic classification of knowledge (*ʿilm*), and has its analogue in the Erlangen school of philosophy of science, which (as in the traditional Islamic discipline of *kalām*) critically analyses the structures and presuppositions of scientific systems of thought.[11] From this perspective, it shall then be clear that al-Attas' philosophy of science is basically a concise systematic explication of the "scientific probity" of *taṣawwuf* or Ṣūfism as *the* discipline of mind and spirit through which experience of ultimate reality is gained. As Peter Coates states it, "There is a strong sense of what could well be described as scientific probity running throughout the *Fusus al-Hikam* and the *Futuhat*

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8. *Ḥujjat*, pp. 464-5.
9. For an account of the "demise of the demarcationist argument" see Meyer, Stephen C. "The Methodological Equivalence of Design & Descent" in J. P. Moreland (ed., 1994), *The Creation Hypothesis: Scientific Evidence for an Intelligent Designer*, InterVarsity Press, Downer's Grove, Illinois, pp. 113-38; henceforth *Creation Hypothesis*.
10. See below, note 24.
11. For the constituent parts of Islamic Science and the divisions of the scientific disciplines, see *CEI* pp. 42-44, and the detailed study of Bakar, Osman (1992), *Classification of Knowledge in Islam*, Institute for Policy Research, Kuala Lumpur, which discusses the classification systems of al-Fārābī (258-339/870-950), al-Ghazālī (450-505/1058-1111) and Quṭb al-Dīn al-Shīrāzī (634-710/1236-1311). For the Erlangen school, see Mautner, Thomas (ed., 1996), *A Dictionary of Philosophy*, Blackwell, Oxford, s.v. 'Erlangen School', p. 135.

al-Makkiyah", and "Scientific probity or verification has, therefore, its analogue in mystical experience."[12]

This article presents an outline of al-Attas' ontological, cosmological and epistemological premises underlying his philosophy of science, and goes on to aspects of methodology and axiology those premises entail. Where relevant, I refer also to some of his other earlier works in which allusions to his philosophy of science are to be found. In the main, my approach is straightforward presentation; occasionally I have been tempted to elaborate at length or to refer to particular (mostly revisionist) western philosophies of science to further inform the discourse and draw attention to wider connections. For instance, W. T. Stace's *Mysticism and Philosophy,*[13] E. F. Schumacher's *A Guide for the Perplexed*[14] and Michael Polanyi's *Personal Knowledge*[15] are, in their respective ways, among the most strikingly corroborative of al-Attas' approach to philosophy of science. One may find much of al-Attas' extreme tautness of expression thankfully amplified (indirectly) through the detached critical appraisal of Stace, the involved commonsensical insight of Schumacher and the sensitive committed inquiry of Polanyi.

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12. Coates, Peter (2002), *Ibn ʿArabī and Modern Thought: The History of Taking Metaphysics Seriously*, Anqa, Oxford, p. 67; henceforth *Ibn ʿArabī*, where he noted that this was also the conclusion of Corbin, H., in *Creative Imagination in the Sufism of Ibn ʿArabī* (1969), trans. by Manheim, R., Princeton University Press, Princeton, p. 46. A similar view is also in Keller, Nūḥ Ḥā Mīm (1999), *Evolution Theory & Islam*, Muslim Academic Trust, Cambridge, p. 11.
13. (1960, reprinted 1989), Macmillan Press, London. With clear, straightforward logical arguments, Stace shows that there are sufficient philosophical and rational reasons to believe that mystical claims do contain objective cognitive content.
14. Harper Colophon edition (1978), Harper & Row, New York. By appealing to our common sense, Schumacher argues for the existence of levels of being higher than the physical and the quantitative, and thus for a holistic rather than a reductionist scientific methodology.
15. Polanyi, Michael (1998), *Personal Knowledge: Towards a Post-Critical Philosophy*, reprinted Routledge, London. Polanyi's thoughtful, erudite eloquence compels our recognition of the significance of passionate personal commitment in all scientific inquiry, a commitment that does not at all diminish the objectivity of the cognitive goal of that inquiry.

Ontology

It is in the *Positive Aspects of Taṣawwuf* that al-Attas first began to outline systematically a philosophical aspect of Ṣūfism which "pertains to what can be developed into an Islamic conceptualization and formulation of the philosophy of science."[16] He grounds his philosophy of science in an ontology or a metaphysical vision of ultimate being and reality that is derived from divine revelation, i.e., the Qurʾān, and affirmed in the direct intuitive experience of the Ṣūfīs.[17] He explains that this ontology is not a mere speculative abstraction but a truth/reality (*ḥaqq/ḥaqīqah*) directly experienced at the state of 'trans-empirical' awareness. It is at this state—which is the state of *iḥsān*—that the rational merges with the empirical, and knowledge means unification (*tawḥīd*).[18] In this ontology, the view of the structure of reality and of human cognition at the sensible level of experience finds validity within the context of the greater validity of the higher levels of reality intuitively experienced by the Ṣūfīs.[19] In other words, the metaphysical vision of reality and truth as experienced and conveyed by the authentic Ṣūfīs through the intellecto-spiritual discipline of *taṣawwuf*—which he defines as "the practice of the *sharīʿah* at the station of *iḥsān*"[20]—is to form the basis for an authentic Islamic philosophy of science.[21]

While the ultimate reality can be inferred discursively through the mediation of sensible experience and discursive reason, as has been the case in *falsafah* and *kalām*,[22] it is the direct unmediated experience of the Ṣūfīs that brings full clarity, conviction and certainty concerning that reality into the heart.[23] Since the Ṣūfīs' description of ultimate reality is an

16. *PAT*, p. 2.
17. Ibid., pp. 9-10, 12-13. al-Attas' affirmation of Ṣūfī ontology is already discernible in *SAS*, an early work.
18. Ibid., p. 8; *IS*, p. 162.
19. Ibid., pp. 12-13.
20. *IS*, p. 162.
21. Ibid., p. 13.
22. Sabra, A. I. (1994), "Science and Philosophy in Medieval Islamic Theology: The Evidence of the Fourteenth Century" in *Zeitschrift für Geschichte der Arabisch-Islamischen Wissenschaften*, Band 9, Institut für Geschichte der Arabisch-Islamischen Wissenschaften, Frankfurt am Main, p. 23; *Ḥujjat*, pp. 208-13; Craig, William Lane (2000), *The Kalām Cosmological Argument*, Wipf and Stock Publishers, Eugene, OR.
23. *Ḥujjat*, pp. 295-300.

outcome of direct vision, not indirect abstraction, it is hence the most authentic and accurate of descriptions, and thereby the most convincing, authoritative and believable:

> When the Ṣūfīs speak of the 'truth', they refer to the knowledge whose real content is truth of the highest degree of certainty (*Ḥaqq al-yaqīn*), because it is gained by direct experience. This direct experience alludes to a trans-empirical state of awareness such as we have already mentioned in which they 'see' the reality of the Multiplicity of phenomena in the Unity of the One Real Being, and the Unity of the One Real Being in the Multiplicity of phenomena. It is certain knowledge of this Reality and Truth gained by means of such an experience that made it possible for them *not to deny* existence to the world together with all its parts and regard them all as sheer illusion, *but to affirm* instead *both* the Existence of God Who, as the Absolute Reality underlying all creation is appropriately called the Truth (*al-Ḥaqq*), *and* the existence of the creatures, not as independent, separate, self-subsisting entities, but as so many particularized forms of the determinations (*taʿayyunāt*) and self-manifestations (*tajalliyāt*) of the Truth in the context of the Unity of Existence (*waḥdat al-wujūd*). The separate things in creation are on the one hand real when considered in relation to their metaphysical Source; and on the other hand not real when they are considered *in themselves*. This is the true (*Ḥaqq*) metaphysical vision of Reality. In this vision some form of subject-object relation between man and God is maintained; the dichotomy between Creator and creature, between Lord and slave is still intact....The false (*bāṭil*) metaphysical vision of Reality, on the other hand, either denied existence to the world together with its parts, or affirmed its existence as independent, self-subsistent entities, leading in either case to pantheism with its extreme immanence; or to a type of theism tending towards extreme transcendence; or to monism and the obliteration of the real distinction between God and His creatures;

> or to dualism which admits in any domain two independent and mutually irreducible substances.[24]

Thus al-Attas expounds what can be called a realist philosophy of science[25] in which relative reality is ascribed to the sensible world and ultimate reality to the Absolute Being (God). Since the sensible world is only relatively real (i.e., contingent, *ḥādith*), experience of it alone cannot serve as the basis for an authentic philosophy of science. Such a basis must be gained from direct intuitive vision of higher supra-sensible realities under which the phenomenal physical world is subsumed. This vision of the transcendent unity of existence or being (*waḥdat al-wujūd*) is a 'positive' one because it is "not merely a subjective affair, but conveys also a cognitive, objective content."[26] Hence, this vision is accessible in principle to anyone who is willing to tread the Ṣūfī path of intellecto-spiritual discipline, just as rigorous mathematical and technical training in the discipline of physics, for instance, is required for an effective understanding of relativity, quantum mechanics and superstring theory.[27] In contrast to many Muslim scholars and intellectuals, al-Attas, therefore, wholeheartedly defends and expounds in rational terms "the scientific legitimacy of Ṣūfism as a valid method of arriving at the ultimate nature of reality."[28]

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24. *PAT*, pp. 9-10. All italics original, here and elsewhere, unless otherwise indicated.
25. As a matter of fact, in *CEI*, p. 2, al-Attas states that "science is definition—both in the sense of *ḥadd*...and in the sense of *rasm*…—of reality." Definition by *ḥadd* (delimiting) delimits or specifies the "distinctive characteristic of a thing," whereas definition by *rasm* (outlining) outlines the "nature of a thing" (ibid., p. 16).
26. *Ḥujjat*, p. 458; cf. Stace, *Mysticism and Philosophy*, where he deals at length with the problem of objective reference in mystical experience.
27. So we can agree with Auguste Comte's positivism and the logical positivism of the Vienna Circle insofar as authentic knowledge must be one based on experience, but they are being less than positivist when they a priorily and hence quite arbitrarily restrict experience to only the sensible experience of phenomena. As Coates puts it (*Ibn ʿArabī*, p. 67), "But what is really at issue is the narrowness of their [logical positivists'] conception of verification in terms of sense-data; there is nothing intrinsically amiss with the notion of verification itself."
28. *Ḥujjat*, p. 457.

For al-Attas, "*waḥdat al-wujūd* represents the true metaphysical system encompassing the ontological, cosmological and psychological domains in the Islamic vision of reality and truth."[29] Among the definitions of *waḥdat al-wujūd* preferred by al-Attas is the concise one by al-Mahā'imī, namely, "the unity of existence is that whereby things are actualized (*taḥaqquq*), and this is one."[30] In his *Īḍāḥ al-Maqṣūd min Waḥdat al-Wujūd* (*Clarifying What is Meant by the Unity of Being*) ʿAbd al-Ghanī al-Nābulsī (d. 1143/1733) explains (as paraphrased by Keller) that "by the 'unity of being' Sufis do not mean that the created universe is God, for God's being is necessary (*wajib al-wujud*) while the universe's being is merely possible (*ja'iz al-wujud*), i.e. subject to non-being, beginning, and ending, and it is impossible that one of these two orders of being could in any sense *be* the other, but rather the created universe's act of being is derived and subsumed by the divine act of creation, from which it has no ontic independence, and hence *is* only through the being of its Creator, the one true Being."[31] For al-Attas, the Ashʿarite conceptualization of this ontic dependence of nature on the Creator in terms of the cosmological atomistic/occasionalistic theory of the "perpetual recurrence of creation" already implies *waḥdat al-wujūd*.[32]

In this rational-intuitive conceptualization of the ontic relation between God and the world, al-Attas follows Ibn al-ʿArabī who has rearticulated in systematic terms the direct intuitive experience of the Ṣūfīs. Ibn al-ʿArabī conceives of this relation in terms of the ontological 'descent' (*tanazzul*) of Absolute being in five non-temporal and non-spatial stages, of which the last is the world of empirical, tangible things:[33]

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29. *PAT*, p. 2 n. 3
30. *Ḥujjat*, p. 405.
31. Keller, Nūḥ Ḥā Mīm (1994), *Reliance of the Traveller: A Classic Manual of Islamic Sacred Law,* Amana Publications, Beltsville, Maryland, p.1020 n. x5.
32. *Ḥujjat*, p. 295; see also below, note 65.
33. For an extended elaboration on the non-spatiotemporal nature of the stages of ontological descent see *PAT*, pp. 10-11; *Prolegomena*, pp. 260, 267-319, esp. 274-80; *Rānīrī*, pp. 50-54 passim, *Mysticism*, pp. 67, 69-73, 76-77, 77 n.44, 79, 106; *Ḥujjat*, pp. 155-76. Al-Attas cautions that this Ṣūfī conception of the ontological degrees of divine self-manifestation is not to be confused with Neoplatonic emanationism in which the role of the divine will is diminished and the 'lower' degrees of being gradually 'deteriorates' from the source and finally acquires a kind of ontic autonomy (*Mysticism*, 72-3).

1. The Divine Oneness (*al-waḥīdiyyah*)
2. The Names and Attributes (*al-asmā' wa'l-ṣifāt*)
3. The Permanent Archtypes (*al-aʿyān al-thābitah*)
4. The Exterior Archtypes (*al-aʿyān al-khārijiyyah*)
5. The World of Sense and Sensible Experience (ʿ*alam al-shahādah*)

"The reverse of this ontological descent is the 'ascent' (*taraqqī*) of the things of the empirical world back to their source of existence. There is, to be sure, no time sequence involved in the dynamic process; it is an eternal process describing the order of the Absolute Being and Existence."[34] Thus al-Attas cautions that the words 'ascent' and 'descent' here are to be taken in the metaphorical sense as referring to the "various ways in which He [God] manifests Himself to us *in the course of our knowledge of Him*."[35]

This ontological scheme implies that the cultivation of true scientific learning in Islam is not merely a matter of the senses and the discursive mind whose operational scope is restricted (as in modern science) to the "world of sense and sensible experience." The learning and practice of true science also involves an integrated discipline of spirit, intellect and conduct by which one self-consciously affects an ascent to higher trans-empirical realities through the intuitive faculty of the soul. For it is only within the greater context of these higher realities that the true nature and significance of the phenomenal world can be understood.[36] Accordingly, in Islamic science, the horizontal pragmatic (descriptive, predictive and manipulative) knowledge about the 'workings' of nature is

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34. *PAT*, p. 11. This means that time and space are not 'external', extramental objective and universal absolutes conditioning this dynamic process, but are themselves relative, contingent constituents of this process and hence products of divine creativity.
35. *Rānīrī*, p. 52; *Mysticism*, p. 73. Italics mine. For further, detailed philosophical elaboration of this ontology, see *Prolegomena*, pp. 177-331.
36. In a recent personal communication, Associate Professor Shahidan Radiman, Head of the Nuclear Science Programme of the National University of Malaysia, comments: "This is to say that the physical world (ʿ*alam al-ajsām*) is embedded in the non-physical world (ʿ*alam al-ghayb*), [and moreover] it is just a drop in the ocean of the Unseen."

aligned to and subsumed under the vertical, contemplative appreciation of the 'meaning' of nature. In this way, growth *of* knowledge about the world leads to growth *in* knowledge about what transcends the world, and that is the ultimate aim of science. Axiologically, this means that science in Islam is always science in the 'service of Islam.'[37]

Cosmology

Al-Attas' cosmology or vision of the structures and processes of phenomenal reality, from galaxies to atoms, flows from his Ṣūfī ontology. In this cosmology, the world of nature is viewed as the analogous but created counterpart to the uncreated, revealed Qurʾān. The basis of this analogy is that both are essentially self-consistent integrated systems of signs (*āyāt*) that tell man about their Creator/Author. Therefore the external world of nature and the internal world of the human psyche provide an "autonomous" experiential avenue by which any rational human being can be brought to affirm the truth of the message of the Revelation. In other words, the truth of Revelation is verifiable in experience, whose meaning in turn is informed by the former.

The world is a "Great Open Book" and so "every detail therein, encompassing the farthest horizons and our very selves, is like a word in that Book that speaks to man about its Author,"[38] as alluded to in the Qurʾānic verse: *We shall show them Our portents on the horizons and within themselves until it will be manifest unto them that it* [the Qurʾān] *is the Truth*.[39] Al-Attas elaborates at some length on the conceptual significance of the metaphor of the word for our understanding of the true nature of things in the world and their proper status as objects of scientific inquiry.

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37. King, David A. (1993), *Astronomy in the Service of Islam*, Variorum, Aldershot, Hampshire. More generally, Bakar, Osman (1999), *The History and Philosophy of Islamic Science*, Islamic Texts Society Cambridge, esp. pp. 1-11; and Nasr, Seyyed Hossein (1976), *Islamic Science: An Illustrated Study*, World of Islam Festival Publishing Company, London. An excellent work of contemporary technical science in the service of Islamic sacred law (*fiqh*) is Keller, Nuh Ha Mim (2001), *Port in a Storm: A Fiqh Solution to the Qibla of North America*, Wakeel Books, Amman.

38. *PAT*, p. 6; *CEI*, p. 17.

39. Q. 41:53; *CEI*, p. 17. This verse applies to modern science as well, for modern scientists, despite themselves, are increasingly faced with empirical prospects of the transcendent; see "Science of the Sacred", special feature in *Newsweek* (Nov. 28, 1994).

> Now the word as it really is, is a sign, a symbol; and to know it as it really is, is to know what it stands for, what it symbolizes, what it means. To study the word as a word, regarding it as if it had an independent reality of its own, is to miss the real point of studying it.[40]

Just as the letters, words and sentences constituting a book are never studied solely for the sake of unraveling their formal syntactic and morphological structures (grammatical rules of language), but also and more importantly for the sake of gaining appreciation of the metagrammatical network of semantic content borne through those structures, so similarly, the things, structures, events and processes constituting the world ought not to be studied merely for uncovering their formal governing 'physical laws of nature', but also and more importantly for discerning the metaphysical significance underpinning those laws: "...the world of nature consists of signs of God revealing to man its symbolic significance and allowing man to observe and involve himself in knowing this aspect of Reality in order to apprehend its ultimate nature."[41]

Since the order and system of things in created nature are analogous to the order and system of words in the revealed Book, then "the things of the empirical world are to be treated as 'words', as signs and symbols operating in a network of conceptual relations that altogether describe an organic unity reflecting the Qurʾān itself."[42] In this sense, the physical organic unity of the world is the external existential reflection of the conceptual organic unity of the Qurʾān.

Thus, in this cosmological vision nature is studied not for its own sake but in virtue of a meaning or a truth that transcends it and yet is reflected or instantiated in it, and in virtue of which it is created. In other words, a thing like a word exists by virtue of the transcendent meaning it bears, it does not exist by virtue of its own self, for it has no 'self' apart from the meaning. Like words in a book, things in nature have no independent reality whether essentially or existentially, and hence—in Nūrsī's terms—they have no nominal, self-referential meaning (*maʿnā ismī*) but only

40. Ibid., p. 6.
41. *Ḥujjat*, p. 460.
42. *PAT*, pp. 7-8.

relational, other-referential meaning (*maʿnā ḥarfī*).[43] They refer to other than themselves, and that 'other' is the truth they mean.[44] Therefore the modern scientific study of things, of 'laws of nature', as if they were "ultimate and subsistent," is a study "devoid of real purpose," and such a study becomes a "deviation from the truth" and its validity questionable.[45] By the very act of seeing nature as ultimate and subsistent, modern science in fact forgets and overlooks the ultimate for the proximate, the real for the apparent, and thereby misses the whole point of its study.

This conception of the true nature of phenomenal reality has, in turn, logical consequences for al-Attas' conception of the nature of causality or the nature of the relations obtaining between things and events in time and space. Coming back to the analogue of the word, the *real* connection between the discrete individual words constituting a book or a speech is conceptual (i.e., by virtue of their semantic content and syntactic form), and not physical (i.e., not by virtue of their visible script and audible sounds). These words project a coherent system of meanings that inhere not in the words themselves but in the mind of the writer or speaker objectively expressing his creative thought. Just as words merely partake of symbolic reality manifesting the speaker's creative thought at the level of verbal reality, so, similarly, nature is ultimately only a symbolic form

43. Here Badīʿuzzamān Saʿīd Nūrsī (1877-1960) draws from the Arabic grammatical categories of '*ism*' (noun) and '*ḥarf*" (letter or particle), for in Arabic grammar the noun is defined as a word indicating a meaning inherent in the word itself (*kalimatun dallat ʿalā maʿna fī nafsihā*), whereas the particle indicates a meaning inherent in another word (*kalimatun dallat ʿalā maʿnan fī ghayrihā*) thus pointing to that which transcends it; see his *Mesnevi-i Nûriye*, 46, cited in Sükran Vahide (2000), "The Book of the Universe: Its Place and Development in Bediuzzaman's Thought" in *A Contemporary Approach to Understanding the Qur'ān: The Example of the Risale-i Nur*, proceedings of International Symposium, Istanbul 20-22 September 1998, Sözler Nesriyet, Istanbul, pp. 466-83 on page 471. A fuller discussion of *maʿnā ḥarfī* and *maʿnā ismī* in relation to causation and causality and the synthetic interpretation of nature is Mermer, Yamine B. "The Hermeneutical Dimension of Science: A Critical Analysis Based on Said Nursi's Risale-i Nur," in *The Muslim World Review*, Special Issue: *Said Nursi and the Turkish Experience*, LXXXIX: 3-4 (July-Oct, 1999), pp. 270-96 passim.

44. *IPS*, p. 28; *PAT*, p. 6; *Prolegomena*, p. 134.

45. *IPS*, pp. 27-8; *PAT*, p. 6; *Prolegomena*, pp. 133-34.

manifesting divine creativity at the level of phenomenal sensible reality.[46] Instead of a "word—>word" or "event—>event" causality giving rise to meaning and order, there is rather at every instant a self-expressing "*intelligent speaker—>word*," or "*intelligent agent—>event*" causality. Thus for al-Attas, "cause here should not be understood in the Philosopher's sense of the term, rather in al-Ghazzali's sense of the term—as a cause in the special sense—that is as brought about by a *willing* agent."[47]

Just as a book or sentence consists of discrete words and letters, so similarly in this conception of causality, nature consists of discrete, discontinous events, processes and relations which in reality are but perpetually renewed manifestations of an underlying, abiding spiritual reality of existence that both includes and excludes them.[48] The multiple and diverse natural forms "partake of symbolic existence by virtue of being continually articulated by the creative word of God,"[49] as alluded to in the verses, *His command, when He intended a thing, is only that He says unto it: Be! and it is*;[50] *As We began the first creation, We repeat it*;[51] and *Each day He is upon some task.*[52] In sum, nature is a symbol through which is manifested a reality higher and more enduring than it, or in ibn al-ʿArabian terms, the phenomenal world is the theatre of manifestation (*maẓhar*) of the One Unique Being.[53]

Consequently, things in the world are not independent, self-subsisting, self-organizing essences having persistence in absolute time and space,[54] but rather they perish upon coming into existence and are continually being recreated by the Creator,[55] hence "the absence of a necessary

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46. *IPS*, p. 27; *Prolegomena*, pp. 113, 133; *PAT*, pp. 6-8, 11-2.
47. *Rānīrī*, p. 47; *Mysticism*, pp. 101-2.
48. *IPS*, pp. 21, 28, 33; *Prolegomena*, pp. 128, 134, 140.
49. *IPS*, p. 27; *Prolegomena*, p. 133.
50. Q. 36:82.
51. Q. 21:104; cf. Q.29:19, 20 *See they not how Allah originates creation, then repeats it?…Travel in the land and see how he did originate creation, then Allah do bring forth the later production…* Most Qurʾānic translations are based on Pickthall, Muhammad Marmaduke (1977), *The Meaning of the Glorious Qur'an: Text and Explanatory Translation*, Muslim World League, Mecca.
52. Q. 55:29.
53. *Ḥujjat*, p. 296; Coates, *Ibn ʿArabī*, pp. 20-3.
54. *IPS*, p. 28; *Prolegomena*, p. 134.
55. *IPS*, p. 33; *Prolegomena*, p. 139; *PAT*, p. 11.

relation between cause and effect."[56] Everything, from the tiniest particular part to the greatest universal whole, is both *proximately* and *ultimately* caused by Allah alone, continuously and at every instant,[57] for *everyday He exercises power*,[58] and *there is not a thing but hymns His praise*.[59] As Nūrsī explains, "When attributed to the Single Maker, all beings become as easy as a single being."[60]

The implications of such a cosmology are that causes and effects are created together and correlated within an order or integral system in which the causes are but conditions for the effects. This order or integral system is perceived through scientific inquiry as natural patterns and regularities, as 'laws of nature', which in reality only reflect God's "manner of creation" or His *sunnah* (*sunnatuLlāh*). This order has a certain stability, uniformity and continuity because God does not change the manner of His creation: *Lā tabdīla li khalqiLlāh/There is no altering* (the laws of) *Allah's creation*.[61] In short, God creates both causes and effects and connects them together within a dynamic, "unified network of events and

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56. *IPS*, p. 35; *Prolegomena*, p. 142; *Ḥujjat*, p. 256.

57. Nūrsī (tr.,1993), by Hamid Algar as *The Supreme Sign*, Sozler Nesriyat, Istanbul, pp.115-21 passim.

58. Q. 55:29; *Mysticism*, pp. 80-1.

59. Q. 17:44. It can be said that in philosophico-scientific terms this verse and other verses of similar import allude to the logico-empirical fact that given any integral system, if the ultimate efficient cause for the whole system exists, then this same ultimate cause has also, of necessity, to be the proximate efficient cause of each and every part of the system. Among the empirical bases of this proposition is the biochemical phenomena of 'irreducible complexity' and 'specified complexity', and the cosmo-biospheric phenomena of 'fine-tuning' described, respectively, in Behe, Michael J. (1996), *Darwin's Black Box: The Biochemical Challenge to Evolution,* Free Press, New York, pp. 39-40, 42-45; in Bradley, Walter L. and Thaxton, Charles B. "Information and the Origin of Life" in *Creation Hypothesis*, pp. 173-210, and in Ross, Hugh "Astronomical Evidences for a Personal Transcendent God" in *Creation Hypothesis*, pp. 141-72. For the conceptual fit between 'fine-tuning' and the Qur'ānic concept of *taskhīr*, see Setia, Adi (2001), "The Qur'ānic Concept of *Taskhīr* in Fakhr al-Dīn al-Rāzī and Badīʿuzzamān Saʿīd Nūrsī" in *al-Ḥikmah*, no. 18 and 19, ISTAC, Kuala Lumpur.

60. Nursi (tr., 1997) by Sükran Vahide as *Nature; Cause or Effect*?, Sözler Nesriyat, Istanbul, p. 47.

61. Q. 30:30. See also, 33:62; 35:43; 48:23, for verses of like import.

relations."[62] Scientists perceive and describe an aspect of this integral system in terms of a certain linear spatio-temporal order of priority and posteriority governing things and events in nature, some of which they posit as antecedent 'causes' for others, the consequent 'effects', whereas in reality causal efficacy lies with God alone.[63] As stated by Guiderdoni, "the regularities observed in the world are not due to causal connection, but to a constant conjunction between the phenomena, which is a custom established by God."[64]

Al-Attas points out that it is in the light of these Qurʾānic verses bearing on the true nature of causality that the original philosophical contribution and significance of *kalām* atomism or occasionalism has to be appreciated:[65] namely as essentially an attempt to demonstrate rationally the absolute poverty of any ontic autonomy on the part of nature and all natural processes, and hence the impossibility of real or efficacious linear or multilinear horizontal naturalistic causality as envisaged in the original Darwinian and various neo-Darwinian theories of evolution. His stand against evolutionary theories is clearly borne out in his respectful criticism of Muḥammad Iqbāl's *Reconstruction of Religious Thought in Islam* for "...his

62. Grof, Stanislav "East and West: Ancient Wisdom and Modern Science," in idem, (ed., 1984), *Ancient Wisdom and Modern Science*, State University of New York Press, Albany, NY, pp. 3-23 on page 10.

63. Paraphrase of Mermer, Yamine Bouguenaya (1997), "Cause and Effect in the Risale-i Nur" in proceedings of the Third International Symposium on Bediuzzaman Said Nursi: *The Reconstruction of Islamic Thought in the Twentieth Century and Bediuzzaman Said Nursi*, tr. Sükran Vahide, vol. I: Sözler Nesriyet, Istanbul, pp. 40-52 on page 45.

64. Guiderdoni, Bruno, "How Did the Universe Begin? Cosmology & Metaphysics for the 21st Century," pp. 1-9 on page 6, conference papers, Conference Manual, International Conference on Religion and Science in the Post-Colonial World, organized by the Center for Religious and Cross-Cultural Studies, Gadja Mada University, Yogyakarta, Indonesia and The Templeton Foundation, USA, January 2-5, 2003. See also idem, "The Islamic Worldview and Modern Cosmology" in Richardson, W. M., Russell, R. J., et al. (eds., 2002), *Science and the Spiritual Quest: New Essays by Leading Scientists*, Routledge, London and New York.

65. *Mysticism*, pp. 190, n. 31; *Ḥujjat*, pp. 210-3; Bakar, Osman "The Atomistic Conception of Nature in Ashʿarite Theology" in *History and Philosophy of Islamic Science*, Islamic Texts Society, Cambridge, pp. 77-101; Wan Mohd Nor, *Educational Philosophy*, p. 322, n. 83, pp. 323-30 passim.

reduction of Ṣūfism such that it becomes confused with the science and philosophy of organic or biological and non-organic evolution."[66] About this "grave mistake" of Iqbal[67], al-Attas has this to say:

> Neither the creative evolution of Bergson, nor the theory of evolution of Nietzsche about the inexplicable, new mutation of the human species bringing into existence the superman is congenial to Ṣūfism or to Islām. Indeed the evolutionary concept of nature in modern science and philosophy already implies a sort of contempt for past human achievement—a character trait prevalent among the so-called Muslim 'modernists'. As to Darwin's theory of biological evolution which caused the emergence of the concept of evolution in modern science and philosophy, this is alien to Ṣūfism and to Islām. It is true that in the writings of the Ikhwān al-Ṣafā, of ibn Miskawayh, of Ṣūfīs such as ibn ʿArabī and Rūmī, and later again repeated in the work of ibn Khaldūn, a scientific form of a theory of evolution is found which bears a striking resemblance to the Darwinian theory of evolution. But the resemblance is superficial, for the Muslim thinkers and Ṣūfīs were referring to the gradation in nature involving the spiritual evolution of man, not to the evolutionary concept of nature that Darwin inaugurated in modern science and philosophy.[68]

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66. *Ḥujjat*, p. 460. For Iqbal's *Reconstruction*, see the 2nd annotated edition by Sheikh, M. Saeed (1989), Iqbal Academy & Institute of Islamic Culture, Lahore, which provides useful references to the many authors and works cited by Iqbal.

67. *Ḥujjat*, p. 460.

68. *Ḥujjat*, pp. 460-61. Modern evolutionary theory, especially in the neo-Darwinian formulations of Gould, Stephen Jay (1980), *The Panda's Thumb*, W. W. Norton & Co., New York and London; Dawkins, Richard (1976), *The Selfish Gene*, Oxford University Press, Oxford; idem, *The Blind Watchmaker* (1985), W. W. Norton, London; Ruse, Michael (1986), *Taking Darwin Seriously: A Naturalistic Approach to Philosophy*, Basil Blackwell, Oxford; Dennet, Daniel (1995), *Darwin's Dangerous Idea*, Simon & Schuster, New York; Sober, Elliot (1993), *Philosophy of Biology*, Oxford University Press, Oxford:, et al., is essentially a sophisticated re-articulation in scientific/biological terms

Al-Attas' conception of causality necessarily impinges on notions of time and space. Since things and events partake only of symbolic existence, the distinction between them is ultimately ideal and logical, not substantial and spatio-temporal. This means that time and space are not the two independent, objective and absolute self-subsistent realities against the background of which the cosmological drama is acted out, but rather they partake of the relativity of physical things and events. Or as Paul Davies puts it:

> ...space and time are not merely the arena in which the drama of the universe is acted out but part of the cast. That is, space-time is as much a part of the physical universe as matter; in fact the two are intimately interwoven.[69]

In reality, time and space are but conceptual categories by which the things and events of the phenomenal world are experienced and ordered meaningfully in the mind of the perceiver. Hence, time and space are just as created as the things and events themselves. This interrelativity of time and space to entities and events and to perception is indicated in

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of the philosophical notion of progress which affirms the auto-development of what is latent in eternal matter. Some recent religious, philosophical and scientific critiques of biological evolution are Moreland, J. P., (ed., 1994), *The Creation Hypothesis: Scientific Evidence for an Intelligent Designer*, InterVarsity Press, Downer's Grove, Illinois, esp. the articles in pt. II, pp. 139-269; Behe, Michael (1996), *Darwin's Black Box*, Simon & Shuster, New York; Denton, Michael (1996), *Evolution: A Theory in Crisis*, 1st paperback ed. Adler & Adler, Chevy Chase, MD; Yahya, Harun (tr. 2000) by Mustapha Ahmad as *The Evolution Deceit: The Scientific Collapse of Darwinism and Its Ideological Background*, Ta Ha, London; Janabi, T. H. (1990), *Clinging to a Myth: The Story Behind Evolution*, American Trust Publications, Indianapolis, IN; Johnson, Phillip E. (1994), *Darwin on Trial*, Monarch, Crowborough, East Sussex; Lunn, Arnold (ed. 1947), *Is Evolution Proved: A Debate between Douglas Dewar and H. S. Shelton*, Hollis and Carter, London; Bakar, Osman (ed., 1988), *Critique of Evolutionary Theory: A Collection of Essays*, ASASI & Nurin Enterprise, Kuala Lumpur; Dewar, Douglas (1957), *The Transformist Illusion*, Dehoff Publications, Murfreesboro, Tennessee; and Keller (1999), *Evolutionary Theory and Islam*.

69. "Introduction" to Heisenberg (reprn., 1990), *Physics and Philosophy*, Penguin Books, London, p. 3.

numerous Qurʾānic verses such as *Your creation and your raising* (from the dead) *are only as* (the creation and raising of) *a single soul*;[70] and *Our commandment is a single act, as a twinkling of the eye.*[71] As al-Attas explains it:

> ...we see, from the point of view of human cognition, and when we consider the act of creation and the creative process that follows in terms of the 'descent' of ultimate Reality from the degree of pure absoluteness and utter concealment to those of manifestation and determination in the lower degrees of the ontological levels, that it is the human mind that posits (*i.e. iʿtibār*) a temporal sequence, a distance measureable in terms of time, from the highest to the lower degree; whereas in reality the act of creation and the whole creative process involved in the varying degrees occurs all at once...[72]

In other words, time and space, including spatio-temporal causality are categories applicable to human perception, cognition and action; they are not applicable to God's knowledge and His creative act. Hence there is no necessary horizontal relation between one thing or event with another in the sensible, physical world. Any apparent horizontal relations obtaining between things and events are only just that, apparent, and only by virtue of their necessary, direct relation to their common vertical ontological source, God; thus *there is not a thing but hymns His praise.*[73]

The conclusion from this is that cosmological laws and regularities are not inherent, necessary properties of the cosmos, but are properties designed for and imposed on it (*taskhīr*) by a Unique, Transcendent Intelligent Being of Will and Power—properties which are somehow perceived by the human mind through its committed involvement in the scientific study of nature.

Epistemology

Al-Attas' epistemology is essentially a theory of rational psychology or human cognition. He affirms the traditional view that it is the rational faculty of human beings that marks them off from other creatures, and,

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70. Q. 31:28.
71. Q. 54:50.
72. *Prolegomena*, p. 321, and also in this context, p. 331 ff. for al-Attas' interpretation of the 'Six Days of Creation'.
73. Q. 17:44.

hence, what most defines humanity. Therefore the study of human psychology is essentially the study of the nature and scope of the human intellect by means of which human beings apprehend their relation to God and to the world. From this psycho-epistemological perspective, Islamic science involves the application of the 'sound senses' to the experience of reality, and of 'sound reason' to the apprehension of truth.[74] In line with Islamic faculty psychology as articulated by ibn Sīnā, al-Ghazālī and ibn al-ʿArabī, al-Attas espouses what has been called a "psychological framework of epistemology."[75]

> Since the philosophy about the nature of things in the world of sense and sensible experience (*ʿalam al-shahādah*) is conceived and formulated by man's intellect (*ʿaql*), we shall have at least to know even a little about the intellect by which man is defined and, through which he visualizes reality and truth.[76]

Following al-Nasafī (d. 537/1142), whom he has studied closely,[77] al-Attas affirms that knowledge comes from God Who is the ultimate source. This knowledge from God is acquired or accessed by human beings through the channels of the sound senses, authoritative true reports, sound reason and intuition. This epistemology is summarized in outline

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74. *IPS*, p. 2; *Prolegomena*, p. 112.

75. Mohd Zaidi bin Ismail (2002), *The Sources of Knowledge in al-Ghazālī's Thought: A Psychological Framework of Epistemology*, ISTAC Master's Theses Series no. 2, ISTAC, Kuala Lumpur. For al-Attas' psychology, see *CEI*, pp.13-6, and his (1990)*The Nature of Man and the Psychology of the Human Soul: A Brief Outline and a Framework for an Islamic Psychology and Epistemology*, ISTAC, Kuala Lumpur, which also constitutes Chapter IV of the *Prolegomena*, pp. 143-76.

76. *PAT*, p. 3.

77. "Abū Ḥafṣ ʿUmar Najm al-Dīn al-Nasafī (d. 537/1142) was one of the greatest Sunnī and Ḥanafī juriconsults and theologians belonging to the school of al-Māturīdī (d. 333/944) who wrote an abridgement of the creed of Islām known as the *ʿAqā'id*...., which is the first statement in concise form and well-knit phrasing of the creed to appear among the Muslims...."; see al-Attas' 1988 study of the *ʿAqā'id* in his *The Oldest Known Malay Manuscript: A 16th Century Malay Translation of the ʿAqā'id of Al-Nasafī*, University of Malaya, Kuala Lumpur, pp. 6-7, henceforth *Nasafī*.

below, in which the latter two channels are subsumed under a single common category, the intellect:[78]

SOURCES AND METHODS OF KNOWLEDGE IN ISLAM

Knowledge comes from God, and is acquired through the channels of:

I. Sound senses (*ḥawass*):
   (i) five external senses: touch, smell, taste, sight, hearing
   (ii) five internal senses: common sense, representation, estimation, retention, recollection, imagination

II. True report (*khabar ṣādiq*) based on authority (*naql*):[79]
   (i) absolute authority[80]
      (a) divine authority, i.e., the Qurʾān
      (b) prophetic authority, i.e., the Messenger
   (ii) relative authority,[81]
      (a) consensus of learned scholars (*tawātur*)[82]
      (b) report of trustworthy people in general

III. Intellect (ʿ*aql*)[83]
   (i) sound reason (*ratio*)
   (ii) intuition (*ḥads, wijdān*)[84]

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78. My summary of *IPS*, pp. 9-13; *Prolegomena*, pp. 118-21.
79. True report is ultimately grounded in intuitive experience of sensible or transcendental reality as the case may be; *IPS*, p. 12; *Prolegomena*, p. 121; further discussion in *Ḥujjat*, pp. 292-4.
80. i.e., unquestionable authority; *IPS*, pp. 12-3 and *Prolegomena*, p. 121, where al-Attas says that the Qur'ān and the Prophet "represent authority not only in the sense that they communicate the truth, but in the sense also that they constitute the truth."
81. i.e., competent, not supreme, authority who can be questioned by reason and experience; *IPS*, p. 12; *Prolegomena*, p. 121. See Polanyi, *Personal Knowledge*, p. 164, on the difference between 'competent' and 'supreme' authority in science.
82. *IPS*, p. 12; *Prolegomena*, p. 12; *Ḥujjat*, pp. 292-93.
83. The intellect is a spiritual substance by which the rational soul recognizes truth and distinguishes it from falsehood, and this recognition is expressed through the articulation of linguistic symbols into meaningful patterns; its cognitive function pertains both to sensible and transcendental reality; see *Prolegomena*, pp. 121-3; *IPS*, pp. 13-5.
84. Understood as "sagacity" and "illuminative experience" respectively; see *IPS*, p. 16; *Prolegomena*, p. 124.

The knowledge from God through these channels is grasped by the intellect (*ʿaql*), a spiritual (i.e., non-material) substance inhering in the heart, which is the spiritual organ of cognition "by which the rational soul (*al-nafs al-nāṭiqah*) recognizes and distinguishes truth from falsehood."[85] Reason is not opposed to intuition but is intimately connected to it through the "mediacy of the intellect."[86] The intellect thus subsumes both discursive reason and immediate intuition within its purview and, in this sense, *ʿaql* is "an organic unity of both *ratio* and *intellectus*."[87]

Al-Attas argues that the operational scope of reason and intuition is not restricted to the interpretation and experience of matters of the world of sense and sensible experience. Rather, the scope of the intuitive faculty extends *also* to the "direct and immediate apprehension of religious truths, of the existence and reality of God, of the reality of existences as opposed to essences...indeed...[it extends to] the intuition of existence itself."[88] Through the medium of the intellect, the scope of reason extends also to the reflection on, and systematic articulation of, these intuitive truths.[89] It is through intuitive insight that the "integrated system of reality"[90] is revealed, partially to scientists but wholly to Ṣūfīs.[91] The difference between these two intuitive insights—one partial, the other whole—is due to the fact that while the scientists are led to intuitive discoveries through the disciplining of their capacities to experience and reason at the normal sensible level of consciousness, the Ṣūfīs cultivate, *in addition*, the disciplining of their inner ethico-spiritual faculties by which the ultimate Truth is directly experienced and apprehended.[92] For as

85. al-Attas, *CEI*, p. 14; *ISPF*, p. 174.
86. *IPS*, p. 10; *Prolegomena*, p. 119.
87. *PAT*, p. 3.
88. *IPS*, p. 10-11; *Prolegomena*, p. 119, 177-215 passim.
89. *IPS*, p. 10; *Prolegomena*, p. 119.
90. *IPS*, p. 11; *Prolegomena*, p. 120.
91. *IPS*, p. 12; *Prolegomena*, p. 120
92. *IPS*, p. 12; *Prolegomena*, p. 120. See also *Ḥujjat*, p. 464, where al-Attas says: "But whereas the levels of intuition to which rational and empirical methods might lead refer only to specific aspects of the nature of reality, and not to the whole of it, the levels of intuition at the higher levels of human consciousness to which prophets and saints attain give direct insight into the nature of reality as a whole." Cf. the role of intuition in modern scientific inquiry in Medawar, Peter Brian (1969, reprn. 1980), *Induction and Intuition in Scientific*

ʿAbd al-Karīm al-Jīlī (d. 1408) said, "Man is the link between God and Nature. Every man is a copy of God in His perfection; none is without the power to become a perfect man."[93] Hence, trans-empirical experience of ultimate reality is accessible, in principle, to every human being.

The ʿ*aql* or intellect is then the nexus or isthmus, as it were, by which the ontologically lower phenomenal world of sense and sensible experience is organically connected to its ontologically higher noumenal metaphysical source, and by which the latter is rendered accessible to human experience and understanding. From this unitary, ontological perspective, al-Attas articulates his definition of knowledge, or rather the process of knowing thus:

> Since all knowledge comes from God, and is interpreted by the soul through its physical and spiritual or intelligential faculties, it follows that the epistemological definition would be that knowledge, with reference to God as being its source of origin, is the arrival of meaning in the soul; and with reference to the soul as being its active recipient and interpreter, knowledge is the arrival of the soul at meaning.[94]

Al-Attas makes clear that epistemology reflects ontology, for the "very essence" of man as the "epitome of Creation" is his "rationality which is the connecting link between him and Reality,"[95] and hence the noumenon can be known, in contrast to Kant, for whom knowledge can only be of phenomena.[96] In short, "the operational powers and capacities of the cognitive faculties and senses" extend to both the domains of physical and of metaphysical realities.[97] Accordingly, al-Attas considers human

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Thought, American Philosophical Society, Philadelphia. Medawar speaks about the "intuitive element" in deductive, inductive and analogical reasoning, and in the process of experimentation (pp. 56-7). For him, intuitive insight—as the source of hypotheses—is "non-logical, i.e. outside logic" instead of "illogical" (p. 46). Cf. Polanyi, Michael (reprinted 1998), *Personal Knowledge: Towards a Post-Critical Philosophy*, Routledge, London, pp. 130-1.

93. Cited in *Mysticism*, p. 92.

94. *IPS*, p. 27; *Prolegomena*, p. 133.

95. *Mysticism*, pp. 194-95, also p. 92 n. 157.

96. *IS*, pp. 11, 37; *Mysticism*, pp. 103-10; *ISPF*, pp. 10, 35.

97. *Ḥujjat*, pp. 461-62.

existence "as having different levels corresponding to the various spheres of operation of the external and internal senses." These levels of human existence encompass the ontological, cosmological and psychological domains, and are as follows: [98]

a. Real (*ḥaqīqī*) existence, i.e., objective reality/external world
b. Sensible (*ḥissī)* existence
c. Imaginary (*khayālī)* existence
d. Intellectual (*ʿaqlī)* existence
e. Analogous (*shibhī*) existence
f. Suprarational/transcendental existence or holy existence

The "innate faculty of knowing"[99] or *ʿaql*, which pertains to the psychological domain of human existence, is most clearly manifested in our use of language, for it is through language that the contents of knowledge are most richly and objectively expressed. Al-Attas notes the significance of the traditional definition of the human being as *al-ḥayawān al-nāṭiq*, the 'rational animal', which also means the thinking/speaking animal. Knowing and speaking are intricately bound in such a way that "the articulation of linguistic symbols into meaningful patterns is no other than the outward, visible and audible expression of the inner, unseen reality which we call the intellect (*ʿaql*)."[100] And so, it is through objective language that the subjective mind is known, a view whose implications find many interesting, profound parallels in the Chomskyan cognitive psychology of Ray Jackendoff.[101]

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98. *IPS*, pp. 16-17; *Prolegomena*, pp. 124-25.
99. *IPS*, pp. 13, 24; *Prolegomena*, pp. 122, 131.
100. *IPS*, p. 14; *Prolegomena*, p. 122.
101. There are broad structural similarities between al-Attas' conception of the mind as a spiritual organ of cognition and Noam Chomsky's conception of it as an abstract mental organ which leads to common empirical possibilities as both attempt at defining, to some extent, the innate unseen mind by its "outward, visible and audible manifestation," namely language; see al-Attas, *CEI*, pp. 14-15; *PAT*, p. 3; *IPS*, p. 14; *Prolegomena*, p. 122; *ISPF*, pp. 174-5. Cf. Chomsky, Noam (1989), *Language and Problems of Knowledge: The Managua Lectures*, MIT Press, Cambridge, MA., pp.1-34 passim, as well as some of his many other works; and Jackendoff, Ray (1993), *Patterns in the Mind: Language and Human Nature*, Harvester Wheatsheaf, New York, pp. 3-35 passim, which works out the implications of the Chomskyan

Since the intellect reflects reality, and language reflects the intellect, it follows therefore that language too reflects reality, or at least, it expresses the reality that is perceived by the senses, intuited by the heart and conceptualized in the mind. In other words, the way a man uses language tells much about the way in which he conceives of reality. Specifically, the way language is used in science to form the semantic network of key-terms by which the sensible world is described and organized tells much about the ontological status of this world in a particular scientific worldview.[102] It then follows that the scientific description of the world is not neutral, for this description already involves, at least tacitly, some form of subjective conceptual judgment about the true nature of the world. If that is so, then by what objective criteria does one knows that a particular conceptual judgment accurately reflects/represents and thus 'conforms to' and is 'true of' the nature of external, extramental reality, and, by extension, of the totality of being and existence?

For al-Attas, it is in the answer to this question that ultimately lies the demarcation between Islamic science and Western science. Despite the apparent similarities in the understanding of the nature of phenomenal reality and in the methods of inquiry pertaining to it, the underlying "profound differences" between Islamic and Western philosophies of science is due ultimately to "our affirmation of Revelation—and the Tradition derived from it—as *the* source of true knowledge of ultimate

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linguistic-cognitive approach for human cognitive capacities other than language, such as the cognitive capacities for vision, musical appreciation and culture (social organization).

102. In *CEI*, pp. 1-13, al-Attas elaborates at length on the scientific nature of the Arabic language of the Qur'ān, "which is the language of Islām, and upon which the Islamic sciences are based, and by which its vision of reality and truth is projected" (p. 2). Cf. for instance the discussion in Heisenberg, Werner (1972), *Physics and Beyond: Encounters and Conversations*, Harper Torchbooks, New York, pp. 125-40, 188-90; and idem (1990), *Physics and Philosophy: The Revolution in Modern Science*, Penguin, London, pp. 155-74, where he talks of the relation between the concepts of natural language and scientific concepts, and their connection with experience of reality. Cf. also the discussion in Grünfeld, Joseph (1973), *Science and Values*, B. R. Grüner Publishing, Amsterdam, pp. 76-106, on "Language, Culture and Philosophy" and "Logic, Language and Metaphysics." Cf. also, Polanyi, *Personal Knowledge*, pp. 80-1, 94-5, 112, 286-8.

reality."[103] In other words, the noumenon exists and it can be discursively inferred to through the study of phenomena, and this discursive knowledge is in turn both confirmable subjectively through direct personal intuition *and* objectively through authoritative Revelation and Tradition, and the shared experience of the Ṣūfīs. In line with the idea that the intellect reflects reality, al-Attas says that the divine revelation is addressed to the human soul and coheres within a system of conceptual relations already imprinted upon the soul or "intelligential spirit."[104] The speculative conception of external reality is true if it is confirmed by Revelation and if it coheres within an integrated system of interrelated truths as apprehended by the soul. In other words, any discursive conception of the world is true insofar as it is in accord with the internal intuitive apprehension of the soul and with the external divine revelation, and insofar as it is in harmony with the "true order of reality,"[105] or *al-fiṭrah*,[106] which obviously includes the natural orders of both the external macrocosmos and the internal microcosmos of the human psyche.[107]

This assumption of a given unacquired intuitive and revelatory source of true judgments transcending discursive reason is both a logical and an empirical imperative. Already, relentless modern scientific inquiry into the nature of the physical world has led to the conclusion that it is contingent and thus not self-explanatory, and thereby to the postulation of its real, efficacious metaphysical source. For without this assumption of a metaphysical explanation, discursive scientific argumentation would, in the final analysis, only be tautological or circular or infinitely regressive.

Methodology

Given al-Attas' ontology, cosmology and epistemology as outlined above, what then would be the appropriate *principal* scientific method or conceptual tool for inferring the meaning (wider interrelations and

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103. *IPS*, pp. 8-9, 34; *Prolegomena*, pp. 117-8, 140-1.

104. *IPS*, p. 34; *Prolegomena*, p. 141.

105. *IPS*, pp. 24-25; *Prolegomena*, pp. 130-1.

106. *Prolegomena*, pp. 41, 51-2, 144; *Psychology*, p. 2; al-Attas (1976), *Islām: The Concept of Religion and the Foundations of Ethics and Morality*, ISTAC Kuala Lumpur, pp. 12; *IS*, pp. 45, 61-2, 139, 163, 163 n. 124.

107. Among other things, it may be said here that this holistic epistemology is pregnant with positive, universal implications for overcoming the ecological crisis both at the conceptual and political levels, but this would not be the place to elaborate.

ultimate significance) of physical phenomena (things, events and processes constituting the world) Al-Attas proposes the method of *tafsīr* and *ta'wīl* for "just as the Qurʾān contains apparent (established) and hidden (ambiguous) meanings, so does the book of nature contain meanings that are established and those that are ambiguous."[108] Thus he draws a methodological analogy between studying the book (language) of revelation and studying the book (language) of creation.[109]

For this methodology to be scientific and for the analogy to be valid, a degree of objective semantic permanence and precision is presupposed for the conceptual structural network of Qurʾānic vocabulary[110]—a degree of permanence and precision which is somehow reflected in the order, regularity and harmony of natural phenomena. Just as there are permanence and order in the meanings of the words of the Book, so too there are permanence and order in the meanings of the things of Nature.[111] Just as there is no "crookedness" (*ʿiwaj*)[112] in the Arabic language of the Qurʾān (book of signs of Revelation), so correspondingly there is no "rift" (*tafāwut*)[113] in the physical structure of Nature (book of signs of Creation); otherwise signs (*āyāt*) will cease to be signs, they will point to nothing, and science will not be possible.[114]

The understanding of the established or apparent signs (*āyāt muḥkamāt*)—whose meanings are more or less transparent or evident to

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108. *Ḥujjat*, p. 456.

109. *CEI*, p. 7 ff. See also Bakar, Osman "The Question of Methodology in Islamic Science," in his book *History and Philosophy of Islamic Science*, pp. 13-38, especially pages 33-38, where he discusses al-Attas on *tafsīr* and *ta'wīl*. Cf. (1992), *Reading the Book of Nature: An Introduction to the Philosophy of Science*, Cambridge University Press, Cambridge, pp. 5-7, where Peter Kosso too draws interesting and insightful analogies between the scientific study of nature and reading and understanding a book, but he does not explain why "in particular" his "methodological analogy is not meant to suggest nature has an author," and so, unfortunately, the analogy is not explored further to its ultimate logical consequence. Wan Mohd Nor in *Educational Philosophy*, pp. 343-54 passim, takes care to caution that the *tafsīr-ta'wīl* method is not to be confused with hermeneutics.

110. *CEI*, p. 2 ff.

111. Paraphrase of *CEI*, pp. 15-6.

112. Q. 39:28; *CEI*, p. 2.

113. Q. 67:3.

114. Paraphrase of *CEI*, pp. 15-16.

the mind or senses—is acquired through the method of *tafsīr*, while the understanding of the ambiguous or subtler signs (*āyāt mutashābihāt*) is through *ta'wīl* (allegorical interpretation). "*Ta'wīl* basically means getting to the ultimate, primordial meaning of something through a process of intellection."[115] This means that the "apparent meanings as arrived at by way of common sense" through the process of *tafsīr* are neither to be considered as final nor exhaustive, but as subsumable under a higher and more general meaning, which, by its very nature, is more abstract (i.e., removed from normal, commonsensical experience) but which is nonetheless more real and fundamental.

As applied to both the physical and spiritual spheres of reality, the apparent significance that is arrived at through *tafsīr* is to be reinterpreted through *ta'wīl* so as to arrive at a deeper or more general significance under which the apparent significance is subsumable. Hence *ta'wīl* is an intensive extension of *tafsīr*, and as such, the two can never be in conflict, because the former must proceed from, and be understood against, the background of the latter. In short, *tafsīr* is a necessary condition of *ta'wīl*, and without responsible *tafsīr* there can be no responsible *ta'wīl*. In both cases—in scientific as well as in religious matters—the recourse to *ta'wīl* is not arbitrary, but arises out of two main considerations: (1) the need to capture subtler aspects of meaning and reality that are somehow perceived but cannot be accounted for, or accomodated within, the normal, commonsensical (*tafsīrī*) interpretative framework; and (2) the need to reconcile between anomalous sets of apparent meanings acquired through *tafsīr* by reference to a higher, more real and more integrative category within which the anomalies can either be resolved or transcended.

By this principal *tafsīr-ta'wīl* methodology, al-Attas alludes to the fact that there are hierarchical degrees of significance in physical phenomena, from the self-evident meanings of immediate sensible experience to abstract meanings farther and farther removed from sensible experience, meanings which ultimately can only be intuited by the intellect. However, there are cognitive limits to the human intellect, including limits to scientific cognition,[116] and therefore:

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115. *IPS*, p. 31; *Prolegomena*, p. 138.

116. A detailed exploration of scientific limits is in Faust, David (1984), *The Limits of Scientific Reasoning*, University of Minnessota Press, Minneapolis, and Barrow, John D. (1998), *Impossibility: The Limits of*

> ...there are things whose ultimate meanings cannot be grasped by the intellect; and those deeply rooted in knowledge accept them as they are through true belief which we call *īmān*. This is the position of truth: in that there are limits to the meanings of things, and their places are profoundly bound up with the limits of their significance.[117]

For al-Attas, as for Schumacher and Coates, the problem of methodology (or verification procedure) in Western science stems from its tacit dogmatic, *a priori* adherence to a speculative metascientific vision that arbitrarily restricts reality to the natural world as the only level of reality[118]—a vision which in turn prematurely "narrows the conception of verification in terms of sense-data."[119] This gives rise to a science that is characterized by what Schumacher refers to as "*a methodical aversion to the recognition of higher levels or grades of significance*"[120]—an aversion which he traces to Francis Bacon (1561-1626), Descartes (1596-1650), Christian Huygens (1629-1695), Immanuel Kant (1724-1804), Charles Darwin (1809-1882), Vilfredo Pareto (1848-1923) and Sir Arthur Eddington (1882-1944).[121]

Mainstream mechanistic science sees the world as "a self-subsistent system evolving according to its own laws,"[122] thus the denial or irrelevancy of God, and the conceptual and methodological reduction of all aspects of reality to the physical as the only level of reality, and the corresponding restriction of the operational scope of human cognitive powers to this level of reality whose valid object and purpose is only to describe and systemize the relations therein.[123] Accordingly, the methods of modern science involve various forms of empirico-rationalism (i.e.,

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Science and the Science of Limits, Oxford University Press, Oxford. For the personal views of prominent scientists on the question of "the end of science" see Horgan, John (1996), *The End of Science: Facing the Limits of Knowledge in the Twilight of the Scientific Age*, Addison-Wesley New York.

117. *IPS*, pp. 31-2; *Prolegomena*, p. 138.
118. *IPS*, p. 5; *Prolegomena*, p. 115.
119. Coates, *Ibn ʿArabī and Modern Thought*, p. 67.
120. Schumacher, E. F. (1978), *A Guide for the Perplexed*, Harper & Row, New York, p. 43.
121. Ibid., pp. 8-12, 51-4, 100-2, 111-6.
122. *IPS*, p. 5; *Prolegomena*, p. 115.
123. *IPS*, pp. 5-6; *Prolegomena*, p. 115.

conceptual systemization of the factual, informative input of sensible experience), which, in keeping with horizontal causalism, serves to abstract general patterns from sensible particulars or to reduce holistic experience to sensible parts or quantitative processes seen as somehow causally prior to yet constitutive of that experience. This is despite the fact that in the course of diligently implementing this reductionist methodological procedure, scientists often find themselves generating ideas pertaining to domains of reality that obviously transcend the strictly empirical spheres of experience and thus may not be reducible to "sensational elements,"[124] and in the process "materialism transcends itself."[125]

Ironically, the inexorable internal logic of the empirico-rational method itself renders such transcendental ideas *not* easily dismissable as irrational or unscientific, or even non-scientific. Modern physics, despite its self-limiting cognitive goals, leads to various considerations of metaphysics, and biology to considerations of teleology, and thus to rational considerations of the very possibility of a real, effective transcendental source of being and knowledge, and, by extension, to the very possibility of an objective 'mystical' experience of that source.[126] Therefore it seems cognitively and intellectually inevitable that honest, reflective scientists like Werner Heisenberg should have expressed their reservations about the Darwinian idea of evolution,[127] and posed to themselves and to their colleagues questions such as these: "Was it utterly absurd to seek behind the ordering structures of this world a "consciousness" whose "intentions" were these very structures?";[128] and

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124. *IPS*, p. 4; *Prolegomena*, p. 114.

125. Popper, Karl R. "Materialism Transcends Itself," in idem and Eccles, John C. (1983), *The Self and Its Brain: An Argument for Interactionism*, 2nd ed., Routledge & Kegan Paul, London, pp. 3-35 passim.

126. For a sampling, see Behe, *Darwin's Black Box*, pp. 187-231 passim; Capra, Fritjof (1983), *The Tao of Physics: An Exploration of the Parallels between Modern Physics and Eastern Mysticism*, revised ed. Bantam Books, Toronto & New York; Grof, Stanislav (ed., 1984), *Ancient Wisdom and Modern Science*, State University of New York Press Albany, NY; Swinburne, Richard (1990), "Argument from the Fine-Tuning of the Universe" in John Leslie, ed., *Physical Cosmology and Philosophy*, Macmillan, New York and Collier Macmillan, London, pp. 154-73.

127. *Physics and Beyond*, p. 213.

128. Ibid., pp. 113-4.

"Can you, or anyone else, reach the central order of things and events, whose existence seems beyond doubt, as directly as you can reach the soul of another human being?"[129]

While Islamic science similarly combines rationalism and empiricism in its methodology, and so does not subscribe to a methodological cleavage between the two,[130] it also affirms Revelation as a source of knowledge about matters beyond the empirico-rational methods of verification and comprehension. While the truth of Revelation is, on the one hand, independent of empirico-rational reasoning, the former is yet accessible to the latter and does not contradict it, but rather it informs, confirms and even "corrects" it. This is because reason "functions in conformity" with the intellect, which intuits the truths of Revelation.[131] Moreover, on the other hand, the inherent limit of the empirico-rational method itself leads the mind inexorably to transcend its own bounds and thence to the affirmation of Revelation and direct, unmediated intuitive knowledge. In this sense belief in Revelation is a scientific belief not a leap of blind faith, for there is no logical or cognitive gap or inconsistency between belief in reason and experience on the one hand and belief in Revelation and intuition on the other. This is so because *if* the empirico-rational method can infer in a logical self-consistent manner to an ultimate Reality, then it can also infer further to the very possibility of this Reality being either directly or indirectly self-revealing and enabling relative, contingent beings to comprehend to a certain extent that divine self-revelation. Thus it seems that for many respectable, prominent scientists, Heisenberg's "central order" can be reachable through a combination of discursive intellectual reflection and direct spiritual experience.[132]

For al-Attas, there is no particular *a priori* method of discovery and justification that is uniform for all problems, for problems vary in degree of complexity and may not all be of one class but of different classes not mutually reducible to one another in a horizontal manner, and nor do they have to be so reducible in the first place. Al-Attas recognizes that

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129. Ibid., p. 215.

130. *PAT*, p. 8.

131. *IPS*, p. 10; *Prolegomena*, p. 119.

132. Richardson, W. M., Russell, R. J. et al. (eds., 2002), *Science and the Spiritual Quest: New Essays by Leading Scientists*, Routledge, London and New York.

Islamic science affirms the existence of hierarchic orders of reality and encompasses them all within its scope of valid, "legitimate scientific" inquiry. Even within the sensible horizontal realm of things, there exist four interrelated yet fundamentally distinctive hierarchic "kingdoms" of nature: the mineral, vegetal, animal and human, in ascending order. And even within the same natural kingdom, the relations between the entities therein are essentially systemic, typological, analogous, hierarchic and discontinous, rather than overlapping, homologous, lineal, sequential and continous. It may be added that this multi-level structural organization is an undeniable, self-evident feature of non-living systems as well.

As Fritjof Capra summarizes it:

> Living systems are organized in such a way that they form multi-level structures, each level consisting of subsystems which are wholes in regard to their parts, and parts with respect to the larger wholes.[133]

At the apex of the order of nature as a whole is humankind, which is a kingdom apart, since in it alone are combined all the salient characteristics of the three preceding natural kingdoms (constituting its "body") and the spiritual kingdom (constituting its "mind/soul"). Hence every human being uniquely partakes of both the natural and the spiritual as the nexus by which the physical is consciously connected to the metaphysical. Any coherent system of knowledge and its resultant methodology, to be adequate,[134] will have to take into unified consideration the ontological and epistemological relation between the human being as the knowing subject who is both body and soul, and

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133. Cited in Baker, Ilyas (1998), "The Flight of Time, Ecology and Islam" in *Islam and the Environment* edited by Harfiyah Abdel Haleem, Ta Ha Publishers, London, p. 76. For a detailed, scientific discussion on the hierarchical and "typological perception of nature" and "the failure of homology" see Denton, *Evolution: A Theory in Crisis*, pp. 93-156. For a candid commonsensical reflection on the self-evident hierarchic structure of the natural world, and what this hierarchy indicates of transcendent realms of being, see Schumacher (1978), *A Guide for the Perplexed*, pp. 15-39.

134. See *Guide for the Perplexed*, pp. 40-61, for Schumacher's elaboration of the concept of *adaequatio*, i.e., the principle that the cognitive powers of the knowing subject are to be adequate for accessing the object to be known.

Reality, the object of this knowing which is experienced yet transcends experience. Therefore,

> the study of nature by science ought not to be reduced to the methods of empiricism and rationalism that operate solely on the world of objects or events in space and time and their relations. The statements and general conclusions derived from these methods must be reformulated, and the methods themselves modified, such that they can be integrated into a unified system that discloses the ultimate Reality in positive terms.[135]

It follows then that problems conceived in relation to a particular aspect or order of reality may not be solvable in the same way as those conceived in relation to a subtler aspect or a higher and more indeterminate order of reality. Even wthin the same natural kingdom, the mineral for instance, the problems conceived in relation to it may be solvable not by any single method in isolation, but by a combination of historical (retroductive), observational, experimental and mathematical methods. Obviously, the problem of methodological adequacy will become more intricate the higher up or lower down the 'ladder' of reality we go,[136] for then the method existentially involves, to a significant extent, not only the object to be known but the knowing subject as well. As Schumacher sees it, problems are mainly either "convergent" that can be solved because they pertain to the physical, quantitative relations among

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135. *Ḥujjat*, p. 465.

136. Or even further horizontally along the same 'physical' level of reality. Heisenberg, in *Physics and Philosophy*, p. 187, warns of the methodological danger of "the somewhat forced application of scientific concepts in domains where they did not belong"; and Michael Redhead in his (1995), *From Physics to Metaphysics*, Cambridge University Press, Cambridge, p. 84 warns of the "real danger in scientism, trying to apply the methods of science to unsuitable areas of experience, such perhaps as the subjective content of human thought." An important, specific case in point is the pseudo-scientific method of vivisection in mainstream modern medical research which invalidly extrapolates from the results of drug-testing on animals and applies them to human beings; see the eye-opening book by Croce, Pietro (1999), trans. by Turtle, Henry as *Vivisection or Science? An Investigation into Testing Drugs and Safeguarding Health*, Zed Books, London.

things, or are "divergent" that are to be "transcended" rather than solved because they pertain to non-physical, higher order qualitative relations obtaining in the complex richness of actual, lived experience outside the rarified, isolated and artificial experience of modern scientific laboratories.[137] Thus the conscious choice and formulation of any specific method or conceptual tool will have to be *a posteriorily* decided on a case by case basis in due awareness and recognition of the "multivalent nature" of reality, of which the knower himself is an intrinsic, existential part.[138]

It further follows then that one cannot simply dismiss out of hand or charge with obscurantism the reflexive, holistic Ṣūfī method of intellecto-spiritual and ethico-moral discipline by means of which experience and knowledge of transcendent reality is truely gained. The only requirement here it seems would be that the Ṣūfī method should be adequate for its task, and open to anyone willing and motivated enough to undergo the necessary discipline it entails. Al-Attas is in effect claiming that the Ṣūfī method is, in principle and in practice, so open and adequate, and hence that it *is* a positive scientific method. His description of *how* the Ṣūfīs attain to experience of ultimate reality serves to support this claim:

> With reference to intuition at the higher levels of truth, intuition does not just come to anyone, but to one who has lived his life in the experience of religious truth by sincere, practical devotion to God, who has by means of intellectual attainment understood the nature of the oneness of God and what this oneness implies in an integrated metaphysical system, who has constantly meditated upon the nature of this reality, and who then, during

137. *Guide for the Perplexed*, pp. 120-8.

138. Coates, Peter (2002), *Ibn ʿArabī and Modern Thought: The History of Taking Metaphysics Seriously*, Anqa, Oxford, pp. 76-7. Cf. Feyerabend, Paul (1987), *Science in a Free Society*, Verso, London, p. 98ff, where he says that "there is no single procedure, or set of rules that underlies every piece of research and guarantees that it is 'scientific' and, therefore, trustworthy. Every project, every theory, every procedure has to be judged on its own merits and by standards adapted to the processes with which it deals…Scientists revise their standards, their procedures, their criteria of rationality as they move along and enter new domains of research just as they revise and perhaps entirely replace their theories and their instruments as they move along and enter new domains of research."

> deep contemplation and by God's will, is made to pass away from consciousness of his self and his subjective states and to enter into the state of higher selfhood, subsisting in God. When he returns to his human, subjective condition, he loses what he has found, but the knowledge of it remains with him. It is in the duration of subsistence in God, when he gains his higher selfhood, that the direct and immediate apprehension takes place. He has been given a glimpse of the nature of reality in that duration of coincidence with the Truth. In his case the cognitive content of his intuition reveals to him the integrated system of reality as a whole.[139]

Normally, most informed but otherwise ordinary people are unwilling, unmotivated or unable for some reasons or others to undergo the discipline required of the Ṣūfī path, and thus they are cut off from the experiential appreciation of transcendental truths accessible through it. Consequently they either have to accept the authority of the Ṣūfīs (just as most informed people who are not directly conversant with the truth-claims of modern physics accept them anyway), or they may reject it outright. But such a rejection would clearly be arbitrary if they *fail* to show that the methods of the Ṣūfīs are incoherent, inadequate and inaccessible in principle or in practice to anyone having the aptitude to undergo them. However, this acceptance of the authority of the Ṣūfīs does not at all mean that scientists have themselves to be practicing Ṣūfīs, but rather that they need to recognize on the intellectual if not experiential level that the Ṣūfī vision of ultimate reality *does* have objective cognitive content and then to proceed to build a philosophy and methodology of science that are in accord with a critical and systematic articulation of that vision.

Al-Attas' philosophy of science is then in effect a systematic argument for what he calls the 'scientific legitimacy' of *taṣawwuf*, or what Corbin and Coates recognize as its 'scientific probity', or what is implied by Keller as its 'methodological adequacy',[140] or ʿ*adaequatio*.'[141] It is at the same time a

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139. *IPS*, p. 11; *Prolegomena*, pp. 119-20; cf. the broadly corrobative "sympathetic" philosophical investigation into mystical experience in general in Stace's *Mysticism and Philosophy*.

140. al-Attas, *Ḥujjat*, p. 457; Corbin, *Creative Imagination*, p. 46; Coates, *Ibn ʿArabi*, p. 67; Keller, *Evolution Theory and Islam*, pp. 9-11 passim.

141. See above, note 134.

systematic rejection of the arbitrary ontic, cognitive, methodological and symbolic self-restriction of modern science.

Axiology

Al-Attas' axiological system is most systematically set out—in his usual taut style—in his *Islām: The Concept of Religion and the Foundations of Ethics and Morality*,[142] and *The Meaning and Experience of Happiness in Islām*.[143] Within the specific context of al-Attas' philosophy of science, his religious axiology naturally bears upon issues such as: What ontological status does this world have in the eyes of the Muslim working as a professional scientist? What are the cognitive and contextual (social) values of the scientific endeavor itself which render it interesting and worthy of being undertaken in the first place? And once the scientific inquiry is undertaken, can the observational descriptions, inferential procedures and interpretative frameworks underpinning the conclusions be articulated in neutral terms that do not express the a priori commitments, background assumptions and cultural values of the scientist? And if science does express the moral values and belief-systems of the scientist and of the social community in which his or her work finds ideological, material and emotive support (as is the consensus among many scientists, historians and philosophers of science lately),[144] what is or what should be the source

142. (1976), ABIM, Kuala Lumpur, henceforth *Islām*. This book constitutes Chapter 1 of the *Prolegomena*.

143. (1993), ISTAC, Kuala Lumpur. This book constitutes Chapter II of the *Prolegomena*.

144. For some examples, see Heisenberg, *Physics and Philosophy*, pp. 175-194; Kuhn, Thomas (1962), *The Structure of Scientific Revolutions*, 2nd ed., with postcript, 1970, University of Chicago Press, Chicago; Grünfeld, *Science and Values*; Curd, Martin and Cover, J. A. (eds., 1998), *Philosophy of Science: The Central Issues,* W. W. Norton & Co., New York & London, section 2 on Rationality, Objectivity, and Values in Science, pp. 83-253, esp. the excerpt by Helen E. Longino, "Values and Objectivity," pp. 170-91, and the editors' excellent, detailed commentary on it and the section as a whole, pp. 210-53. Longino's excerpt is from her book (1990), *Science as Social Knowledge: Values and Objectivity in Scientific Inquiry,* Princeton University Press, Princeton, NJ, pp. 62-82; Lewontin, R. C. (1992), *Biology as Ideology: The Doctrine Of DNA,* Harper Collins, New York; Resnik, David B. (1998), *The Ethics of Science: An Introduction*, Routledge, London & New York; Sorell, Tom (1991), *Scientism: Philosophy and the Infatuation with Science*, Routledge, London & New

or final reference of those values and belief systems? At a fundamental cognitive and evaluative level, how should the nature of facts (or factuality) be conceived and evaluated in relation to truth and falsehood, to reality and falsity,[145] to natural (*fiṭrī*) and artificial order, to knowledge and action? In sum, what is or what should be the ultimate purpose of the scientific endeavor that makes it valuable and meaningful and that justifies it being undertaken to begin with? All these are tough questions, the full, detailed implications of which have yet to be worked out and tackled systematically in contemporary terms from within the Islamic perspective, and this extended outline is certainly not extensive enough to harbor any pretensions of doing so. However, we may proceed.

Although al-Attas does not deal with these and similar axiological issues pertaining to science in detail, a value-system of Islamic science can easily be derived from his exposition of the worldview or belief-system of Islam and the epistemology derived from it. Especially, in his *Islām and Secularism*[146], he has shown quite forcefully that the modern knowledge systems pervading the world today are not value free despite being undeniably sociogeographically ubiquitous. And from within the context of the Islamic metaphysical worldview, he has also shown how progressive, open-ended naturalistic science is ultimately purposeless and useless, and hence bereft of any significant existential and eschatological or salvational value to the concrete human individual given the brute, very personal inevitability of his mortality.[147] His standpoint is that metascientific

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York; and also Polanyi, *Personal Knowledge*, pp. 203-45, on "conviviality" in science.

145. In a recent personal communication, al-Attas reminded me of the important difference between falsity (*bāṭil*=non-reality as opposed to reality, *ḥaqq*) and falsehood (*kidhb*=untruth, lie as opposed to *ṣidq*=truth, pertaining to statements). In relation to statements, the opposite of *ḥaqq* as truth is *kidhb*, falsehood, untruth; in relation to "actions, feelings, beliefs, judgments, and the things and events in existence," the opposite of *ḥaqq* as reality is *bāṭil*, falsity, non-reality or illusion. Thus "the word *ḥaqq* stands for both reality and truth," and so the proper English equivalent of *ḥaqq* is the compound 'truth-reality'. See *Prolegomena*, p. 126.

146. Especially Chapter V on "The Dewesternization of Knowledge," pp. 133-67.

147. *Islām*, pp. 36-7; *IPS*, p. 29; *IS*, pp. 82-5, 146-7; *Prolegomena*, pp. 37-9; al-Attas, "The Worldview of Islām: An Outline," keynote address in *ICM*, pp. 68-71; Wan Mohd Nor, *Educational Philosophy*, pp. 157-8;

assumptions, while distinct from the scientific inquiry itself, serve to justify, direct and guide that inquiry, and provide interpretative frameworks making sense and relevant its factual, informative discoveries; and therefore values are inevitably intertwined with scientific inquiry, even embodied in its conceptual and tangible results.

> ...not *all* of western science and technology are necessarily objectionable to religion; but this does not mean that we have to uncritically accept the scientific and philosophical theories that go along with the science and technology, and the science and technology themselves, without first understanding their implications and testing the validity of the values that accompany the theories....no science is free of value; and to accept its presuppositions and general conclusions without being guided by genuine knowledge of our worldview—which entails knowledge also of our history, our thought and civilization, our identity—which will enable us to render correct judgments as to their validity and relevance or otherwise to our life, the change that would result in our way of life would simply be a change congenial to what is alien to our worldview and we would neither call such a change a 'development' nor a 'progress'.[148]

However, the interplay of evaluative commitment and demonstrative inquiry is not presented here as a cognitive defect, but rather it is seen as a cognitive reality pervading all human inquiry, even the most 'positive', 'hard' and 'exact'.[149] As a matter of historical fact, "Some of the principal laws of science arose originally out of industrial experience. For instance, the Second Law of Thermodynamics resulted from efforts to improve the

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For the eschatological or salvational significance of Islāmic Science, see Guiderdoni, Bruno, previously cited in footnote 63. This eschatological dimension is intimately linked to true science or "true knowledge" which "fulfills man's purpose for knowing"; see below, note 155.

148. *IS*, p. 38.

149. Cf. Polanyi, Michael (1998 reprn.), *Personal Knowledge; Towards a Post-Critical Philosophy*, Routledge, London.

working of the steam engine with a view to advancing industry."[150] And, indeed, even modern mathematics, as Michael Polyanyi (1891-1976) has pointed out, is "kept alive" and meaningful by an intellectual community passionately committed to the value of its "intellectual beauty, which betokens the reality of its conceptions and the truth of its assertions."[151]

What al-Attas is stressing is that all inquirers, Muslims included, need to be honest to themselves and to others by putting their assumptions upfront so that these can be self-examined and also examined in turn by others, and their true sources uncovered. He criticizes the contemporary obsession in the Muslim world with the depersonalised and disembodied tangible results of scientific inquiry in the form of factual information, conceptual constructs (laws, theories, formulas), experimental and observational techniques, and manipulative technologies. These decontextualised results are simply taken to be universally relevant and applicable while the metascientific notions underpinning them are either overlooked, belittled or disregarded altogether—notions that, if brought to the fore and critically examined, would actually turn out to be socioculturally and geo-historically specific, and not at all grounded in any universal natural or pragmatic imperatives.[152] Since science is value-

150. Alvares, Claude (1999), "Science" in *The Development Dictionary: A Guide to Knowledge as Power* ed. by Wolfgang Sachs, 7th impression Zed Books, London & New York, pp. 219-32 on page 222.

151. Polanyi, *Personal Knowledge*, pp.184-93 on page 192. A reflective reading of the intricate history of the solution to Fermat's Last Theorem will bear out the import of Polanyi's point remarkably well; see, for instance, the popular account by Singh, Simon (1998), *Fermat's Enigma: The Epic Quest to Solve the World's Greatest Mathematical Problem*, Anchor Books, New York. As Feyerabend puts it (*Science in a Free Society*, p. 19), "In the sciences and especially in pure mathematics one often pursues a particular line of research not because it is regarded as intrinsically perfect, but because one wants to see where it leads." Thus, there is no purely formal logic, rule or method; they are all both formal and pragmatic.

152. This culture-neutrality view of modern science is evident in Hoodbhoy, Pervez Amirali (1991), *Muslims and Science: Religious Orthodoxy and the Struggle for Rationality*, foreword by Mohammed Abdus Salam, Vanguard Books, Lahore. Though his immediate intellectual motivation is warranted (as a heartfelt reaction against the irrational aberrancy of the literal-fundamentalist science of Zia ul Haq's Pakistan), his solution in the notion of modern science as

laden, then obviously certain facts, certain techniques and even certain inquiries, questions and problems would acquire saliency and validity only within the conceptual, historical and cultural limitations of these meta-scientific notions. Therefore:

> ...the knowledge that is now systematically disseminated throughout the world is not necessarily *true* knowledge, but that which is imbued with the character and personality of Western culture and civilization, and charged with its spirit and geared to its purpose.[153]

While saying this al-Attas already anticipates the counter-argument that his program of 'Islamization' which entails 'dewesternization'[154] would only amount to formulating an alternative system of knowledge aligned to another purpose reflecting another worldview, thus dangerously smacking of an irrational relativism that renders his very concept of 'true knowledge' farcical. But this objection is invalid because there is a universal test of true knowledge, and this test

> ...is in man himself, in that if, through an alternative interpretation of knowledge man knows himself and his ultimate destiny, and in thus knowing he achieves happiness, then that knowledge, in spite of it being imbued with certain elements that determine the characteristic form in which it is conceived and evaluated and interpreted in accordance with the purpose aligned to a particular worldview, is true knowledge; for such knowledge has fulfilled man's purpose for knowing.[155]

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value-neutral is not, but is, indeed, an extreme inversion of the short-sighted fundamentalism he so abhors.

153. *IS*, p. 137.

154. *IS*, pp. 44-46, for 'islamization' defined; and ibid., pp. 133-8, for 'dewesternization' clarified.

155. *IS*, p. 138. On the intimate link between the ultimate purpose of science and the eschatological destiny of man, see above, note 147. See also *Prolegomena*, pp. 134-5, where al-Attas defines 'true knowledge' as "knowledge that recognizes the limit of truth in its every object," and ties this limit to the identity, salvation and destiny of the individual knower. In *IS*, p. 163 n. 124, al-Attas also says that "True knowledge conforms with *fiṭrah*." See also ibid., pp. 45, 61-62,

Certainly a system of knowledge that has become neglectful of and disembodied from the reality of its human subject, and destructive of the very environment inspiring and sustaining it, and whose factual discoveries and inferential conclusions repeatedly contradict its speculative premises and their logical implications, can only be a self-interested system of rationalized incoherence masquerading as objective, universal knowledge. How can a system of knowledge that is not true and sincere to itself claim to be altruistic and thereby demand the intellectual allegiance of others, to the exclusion and demise of all alternative systems of knowing and doing? It is this knowledge which has:

> ...lost its true purpose due to being unjustly conceived, and has thus brought about chaos in man's life instead of, and rather than, peace and justice; knowledge which pretends to be real but which is productive of confusion and scepticism,...knowledge which has, for the first time in history, brought chaos to the Three Kingdoms of Nature; the animal, vegetal and mineral.[156]

139-40 and 162-3 for his elaboration of '*fiṭrah*' in relation to 'religion' ('*dīn*') and 'true knowledge'.

156. *IS*, p. 133. The chaotic, destructive consequences of secular, humanistic yet paradoxically dehumanized modern western science and technology have been quite recently exposed in great factual detail in the works of many honest, courageous and responsible critics. For a small sampling of this corresponding powerful, informative and well-documented socio-cultural, political-economic and techno-environmental insider critique of "worldwide westernization," see Latouche, Serge (1996), tr. by Rosemary Morris as *The Westernization of the World: The Significance, Scope and Limits of the Drive towards Global Uniformity*, Polity Press, Oxford; Rist, Gilbert (2000), tr. by Patrick Camiller as *The History of Development: From Western Origins to Global Faith*, 3rd impression, Zed Books, London & New York and UCT Press, Cape Town; Smith, Linda Tuhiwai (2001), *Decolonizing Methodologies: Research and Indigenous Peoples*, 3rd impression, Zed Books, London & New York and University of Otago Press, Dunedin, New Zealand; Sachs, Wolfgang (ed. 1999), *The Development Dictionary: A Guide to Knowledge as Power*, 7th impression, Zed Books, London & New York and Witwatersrand, University Press Johannesburg; Mander, Jerry (1992), *In the Absence of the Sacred: The Failure of Technology and the Survival of the Indian Nations*, Sierra Club Books, San Francisco and (1977), *Four Arguments for the Elimination of*

Or as Claude Alvares has put it in his incisive criticism of modern science as an "intimate, congenital" facet of the development worldview:

> It is an illusion to think that modern science expanded possibilities for real knowledege. In actual fact, it made knowledge scarce. It over-extended certain frontiers, eliminated or blocked others. Thus it actually narrowed down the possibilities for enriching knowledge available to human experience. It did appear to generate a phenomenal information explosion. But information is information, not knowledge. The most that can be said of information is that it is but knowledge in degraded, distorted form. Science should have been critically understood not as an instrument for expanding knowledge, but for colonizing and controlling the direction of knowledge, and consequently human behaviour, within a straight and narrow path conducive to the design of the project.[157]

Television, William Morrow/Quill, New York; Roszak, Theodore (1972), *Where the Wasteland Ends: Politics and Transcendence in Postindustrial Society*, Garden City, NY., reprn. Celestial Arts, Berkeley, CA, 1989; Rahnema, Majid and Bawtree, Victoria (eds., 2001), *The Post-Development Reader*, Zed Books, London; Clairmont, Frederic F. (1996), *The Rise and Fall of Economic Liberalism*: *The Making of the Economic Gulag*, republished Southbound and Third World Network, Penang; Shiva, Vandana (1995), *Monocultures of the Mind: Biodiversity, Biotechnology and the Third World*, Third World Network, Penang; idem (1997), *The Violence of the Green Revolution: Third World Agriculture, Ecology and Politics*, Third World Network, Penang; Comeliau, Christian (2002), tr. by Patrick Camiller as *The Impasse of Modernity: Debating the Future of the Global Market Economy*, Zed Books London; Tokar, Brian (ed. 2001), *Redesigning Life: The Worldwide Challenge to Genetic Engineering*, Zed Books, London & New York; and O'Sullivan, Edmund (2001), *Transformative Learning: Educational Vision for the 21st Century*, Zed Books, London & New York.

157. "Science," in Sachs, *The Development Dictionary*, pp. 219-332 on pages 230-31. In *Farewell to Reason* (1987), Verso, London, Paul Feyerabend argues rigorously with impeccable documentation for the replacement of the dehumanized, aloof and narrow rationalism of Western science with a truly humane, participatory science that subordinates itself to the authentic needs of citizens and communities. Along the way he vigorously challenges Western

"Since values inevitably enter into all inquiry,"[158] the Weberian[159] and logical positivist notion and ideal of the value-neutrality of modern science is not tenable, neither in practice nor in principle, and so, as Noam Chomsky,[160] Werner Heisenberg,[161] Nicholas Rescher[162] and others have also pointed out, scientists, despite themselves, cannot avoid being morally and ethically responsible for the formulation, direction, methodologies, results and consequences of their work.

Conclusion: Islam and the Challenge of Western Science

Al-Attas sees the challenge of western science as fundamentally the challenge of a rival, ostensibly universal interpretative framework for organizing meaningfully the informative facts of complex, multi-dimensional experience. He is not against the rival interpretation as such, but rather against its tacit (and at times explicit and aggressive) claims to objectivity, universality, probity and thereby to altruism— claims which he finds logically invalid and moreover historically and experientially false. Although this claim of eurocentric cultural hubris also finds powerful internal critiques in the West from amongst many prominent, reflective practitioners and observers of modern science, it is still very much mainstream in both academic and popular circles.[163]

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notions of 'progress' and 'development' whose destructive socio-ecological consequences have facilitated the creation of a "brave new [global bio-cultural] monotony". He sees his 'anarchism' as a much-needed "excellent medicine" for purging Western science of its colossal conceit and smug self-satisfaction that masquerade as Reason, Progress and Development (*Science in a Free Society*, pp. 32-3 and pp. 127-8). The phrase "brave new monotony" is from *Farewell to Reason*, p. 273.

158. Mautner, Thomas (ed., 1996), *A Dictionary of Philosophy*, Blackwell, Oxford, p. 443, s.v. 'value-freedom'.

159. Ibid.

160. Ibid.

161. Heisenberg, *Physics and Beyond*, pp. 192-204.

162. Rescher, Nicholas (1965), "The Ethical Dimension of Scientific Research" in Colodny, Robert G., *Beyond the Edge of Certainty: Essays in Contemporary Science and Philosophy*, vol. 2 in the University of Pittsburg Series in the Philosophy of Science, Prentice Hall, Englewood Cliffs, NJ, pp. 261-76.

163. A recent undisguised eurocentric attempt is Huff, Toby E. (1995), *The Rise of Early Modern Science: Islam, China, and the West*, Cambridge University Press, Cambridge, which, in outdated Weberian terms,

Al-Attas' argument is that however far modern science advances, and however wide it spins its web of influence, it can never transcends the fact that it is the historically conditioned product of a specific cognitive and pragmatic interplay between relative man and relative nature, and thus it is in itself quite incapable of providing any transcendental neutral perspective. For always its findings shall be preconditioned on and predetermined by the inherent cognitive and pragmatic limitations of the logico-empirical method it employs,[164] and its validity constrained by the complexity and diversity of the observable universe it studies, and its form characterized by its particular socio-cultural and political-economic settings. Hence scientific findings shall always be limited findings about particular aspects of nature, and never about the ultimate essence of any specific phenomenon, much less about any ultimate theory of everything.[165] It is in virtue of this general realization that al-Attas calls Muslims toward a powerful comprehensive review of Western natural and social sciences:

> Modern philosophy has become the interpreter of science, and organizes the results of the natural and social sciences into a worldview. The interpretation in turn determines the direction in which science is to take in its study of nature. It is this *interpretation* of the statements and general conclusions of science and the direction of science along the lines suggested by the interpretation that must be subjected to critical evaluation, as they pose for us today the most profound problems that have confronted us generally in the course of our religious and intellectual history. Our evaluation must entail a critical examination of the methods of modern science; its concepts, presuppositions, and symbols; its empirical and rational aspects, and those impinging upon values

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argues for unique, privileged medieval European institutional, cultural and legal structures founding the creation of intellectual "neutral spaces" conducive to the rise of modern science. His thesis is that somehow the rest of the world had missed and is still missing this objectively good structural boat, and so they should better catch up and clamber in.

164. Faust, David (1984), *The Limits of Scientific Reasoning*, University of Minnesota Press, Minneapolis.

165. Redhead, *From Physics to Metaphysics*, pp. 63-87.

> and ethics; its interpretation of origins; its theory of knowledge; its presuppositions on the existence of an external world, of the uniformity of nature, and of the rationality of natural processes; its theory of the universe; its classification of the sciences; its limitations and inter-relations with one another of the sciences, and its social relations.[166]

Since the objective, factual results of science *do* express the passionate commitments, cultural values and belief-systems of the scientist and of the society in which his or her work finds support, then, for the Muslim scientist, the source and final reference of these values and belief systems will have to be a philosophy of science grounded *conceptually* in the Qurʾānic metaphysical vision of reality and aligned *pragmatically* to the five fundamental objectives of the *Sharīʿah* or Sacred Law: the preservation of religious faith and practice, of mind and life, progeny and wealth. This in turn demands that Muslims' reception of Western science must be done creatively through dynamic critical analyses of its interpretative frameworks (presuppositions, inferential procedures, concepts, laws, theories, hypotheses) through which it establishes the 'facts' of the world, including analyses of the pragmatic purposes it tacitly or explicitly serves. It is to this profound intellectual responsibility of the true Muslim scientist that al-Attas alludes to when he says that "Islamic science must interpret the facts of existence in correspondence with...the Qurʾānic system of conceptual interrelations and its methods of interpretation...and not interpret that system in accordance with the facts."[167]

This creativity, by its very nature, goes hand in hand with historical knowledge and contextual appreciation of the authoritative works of the intellectual and moral giants of the Islamic tradition who have articulated in great detail and with exhaustive argumentative rigor their intuitive experience, rational understanding and existential affirmation of ultimate reality and its relation to the phenomenal world. The way ahead toward a "rebirth" of Islamic science will then have to "begin from within the heart" of its authentic traditon. Al-Attas' philosophy of science is an affirmative yet critical recapitulation of the intellectual and scientific achievements of that tradition in contemporary terms—a firm, lofty intellectual plateau upon which an authentic Islamic science as a

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166. *Ḥujjat*, pp. 460-1.
167. *IPS*, p. 35; *Prolegomena*, p. 141; *Mysticism*, p. 190 n. 31.

meaningfully relevant, long term *research program* can be re-erected in the contemporary world, in full dynamic and unapologetic engagement with modern science.

> What we need, then, is not a *reconstruction*, but a *restatement* of the statements and general conclusions of Islamic metaphysics in accordance with the intellectual perspective of our times and the developments in the domain of knowledge; and this entails a *realignment*, where relevant and necessary, of the *direction* of developments in the various sciences such that they become integrated with it.[168]

168. *Ḥujjat*, p. 465. As indicated by Maulana Ashraf Ali al-Thanvi (1863-1934) in his (1992) *al-Intibahat al-Mufeedah*, tr. by Muhammad Hassan Askari and Karrar Husain as *Answer to Modernism,* 2nd ed. Maktaba Darul-Uloom, Karachi, pp. 1-5, this intellectual engagement would require an elaborative reapplication of the "sufficient and comprehensive" principles of traditional *'ilm kalām* (dialectical theology) to answering the challenge of modern science and philosophy.