A Genealogy of the Western Rationalist Hegemony

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Abstract

This paper traces the development of the western mechanistic worldview and its preferred rational ways of knowing. It establishes the relationship between this development and defining moments in dominant discourses within modern biological science, psychology and intelligence theory in the scientific era.

Introduction and Overview

This paper traces the development of critical rationality and rationally defined intelligence from ancient times through to the present. The idea of intelligence will be situated within a civilisational perspective, and in particular the western rationalist hegemony. Thus the development of western theories of mind is first traced, up until the beginnings of the modern era. Then seminal relevant moments within modern psychology and science are identified.

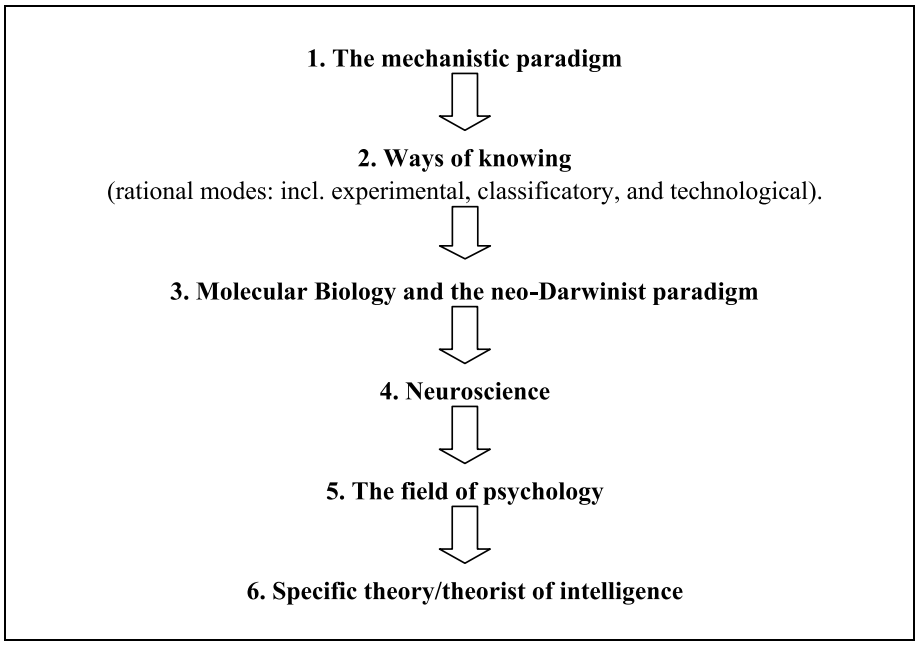
The seminal historical moments which have created the modernist discourses on mind and intelligence will be identified via genealogy. Genealogies seek to determine which discourses have been victorious in constituting the present, how they have traveled through history and the points in which the focus issue has become contentious (Inayatullah 2002: 27). This paper identifies seminal events in the history of western rationality, wherein the mechanistic worldview became dominant (and thereafter largely implicit and unconscious). It analyses the philosophy and/or science within which these events have been embedded. The focus is upon the relationship of this process to dominant mainstream mechanistic depictions of mind and intelligence within modernity.

In regard to the positing of intelligence theory within current dominant discourses, the argument can be depicted as with Diagram 1, above. In the diagram above each level is defined and mediated by the level preceding it.

The employment of ways of knowing - mediated by historical, civilisational and paradigmatic factors - has vitally affected the development of science and scientific conceptions of intelligence and consciousness. The argument here is predicated upon an essential distinction between rational and intuitive ways of knowing. This is illustrated in Diagram 2, below.

There are two intuition types posited here. Inferential intuition is a mundane representation of intuition. It is a subconscious processing of experiential and sensory knowledge. It incorporates no metaphysical or

Diagram 1: Schema Depicting Layers of the Problematique re: Dominant Contemporary Representations of Intelligence and Mind



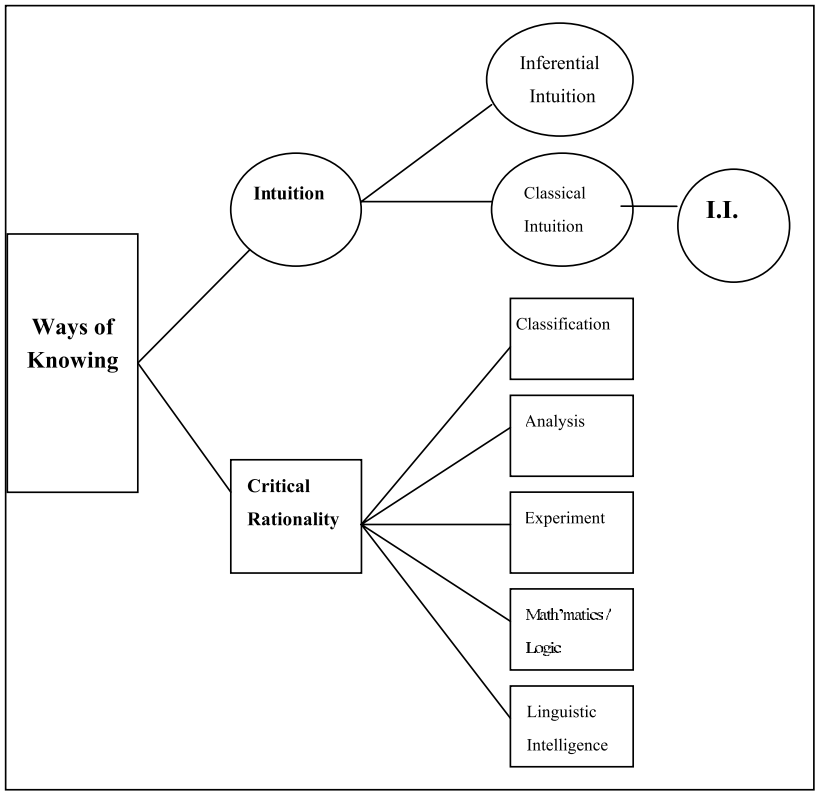
mystical components (Torff and Sternberg 2001). It is the preferred way to depict intuition within modernist discourses. Classical intuition is the second intuition type, which is intuition defined in metaphysical and/or transcendent terms. Historically it has most commonly been depicted in spiritual and mystical texts and forms a part of numerous mystical traditions. Integrated intelligence is a subset of this. This intelligence incorporates transpersonal experience that transcends the boundaries of the individual – it is in effect a collective human and universal intelligence[1]. It is the interplay between integrated intelligence and rationality that is the prime focus of the genealogy to follow.

There are five rational ways of knowing listed in Diagram 2, and they can be seen as subsets of the broader general concept of rationality, which is "the power of the intellect to comprehend, reflect, abstract, analyse, and draw conclusions" (Rohmann 1999: 337).

Firstly, classification (natural history) is "notebook science", and is "about describing and collecting, identifying and classifying, utilizing and displaying" (Pickstone 2000: 60). Natural history as a way of knowing dominated science beginning around the year 1500, when medieval anatomy texts featured naturalistic diagrams (Pickstone 2000: 63). Secondly, analysis as a way of knowing can be seen in science's analyses of the structures, processes and forms of plants and animals. Analysis also incorporates the earth and social sciences, which began to emerge around 1800 (Pickstone 2000: 106). Thirdly, experimentalism is "about making and displaying new worlds". Experimentalism emerged around the mid-nineteenth century (Pickstone 2000: 30). Mathematics as a way of knowing has been added here because its significance in the development of the modern world and science is so great that it requires a category in its own right. Logical-mathematical intelligence is employed to calculate and quantify mathematical problems, and secondly to examine hypotheses and propositions. Finally, rational/linguistic intelligence is the capacity to use language and words to construct and understand thoughts, ideas and meanings (Gardner 1993).

Attention now turns to the genealogy itself.

Diagram 2: Rational and Intuitive Ways of Knowing and Integrated Intelligence



The Past: From Ancient Greece to the Birth of the Modern Secular State

The emergence of rationalism in ancient Greece

Ancient Greek culture was premised upon integrated conceptions of intelligence, where divine and sacred space were closely intertwined (Shapiro 1992: 6; Tarnas 2000). Yet Greek society also developed a rational representation of nature, cosmos and consciousness which was to be seminal in the development of the mechanistic paradigm. The history of ancient Greece was one in where scientific and mechanistic models of mind and cosmos were in constant interplay with more metaphysical and spiritual conceptions (Tarnas 2000).

The rational mind was well represented. Aristotle defined mankind as a rational animal, an increasingly prevalent theme in the ancient Greek world. The schools established by Plato and Aristotle valorised logic, geometry, and "disputation" (Gardner et al. 1996: 33). The mathematical predilections of Archytas, Pythagoras and Plato (Sheldrake 1994: 2005a, b) were also significant. The social sciences that Plato founded at his Academy were predicated upon mathematical models (Brumbaugh 1981: 139). Greek rationality has influenced both science in general and consciousness and intelligence theory into the twentieth century, helping shape the dominant view that intelligence is the capacity for abstract reasoning in mathematics and language (Gardner et al. 1996).

Further, the atomistic tradition of materialism - inspired essentially by the changeless and atomistic conceptions of Parmenides - later contributed to the seventeenth century idea that the universe is mechanistic and changeless (Tarnas 2000). The universe of the ancient

Greeks was a world of separate "blocks", and thought was sequential and linear. This would evolve into the civilisation-defining "sequence trap" (de Bono 1986: 56) which requires that a person be "right at each stage" and thus be able to "keep going forwards" (de Bono 1986: 60). Notably the "sequence trap" stultifies the fluidity and receptivity (openness to non-local mind) that is the basis of integrated intelligence[2].

The philosophy of the ancient Greeks also "implanted the philosophy of dualism very firmly in the western psyche" (Ross 1993: 39). Ancient Greece was a culture that "separated God and nature, mind and body, males and female, master and slave and cause and effect" (Ross 1993: 39). The predicates of scientific objectivity were present in the ideas of Thales, Anaximenes and Heraclitus (Ross 1993: 40). These men were practical-minded, and sought understanding through observation, which allowed them to discern the theories of basic elements (Ross 1993: 40). The Western psyche became enamored by the idea of a metaphysically stratified cosmos. Platonic metaphysics entailed a strong dualism – divinity, mind and reason were clearly differentiated from the body and matter, including nature (Ross 1993: 40). For Plato (and for Socrates), truth was something that was available through perfect reason (Zohar 1994: 108). This single, ultimate knowable truth later became the foundation of enlightenment science (Zohar 1994: 108).

Further, the Socratic method was a question and answer process, with an emphasis on the status of the individual to challenge the polity of the state, and the consensus of society. It was a thus a precursor of modern western intellectual individualism. Socrates also claimed that he did not know anything with certainty, and tended to employ hypotheses instead of didacticisms (Brumbaugh 1981: 126, 129), foreshadowing scientific skepticism. The stoics and skeptics of the later Hellenic era were even more rationally inclined, yet without the spiritual inclinations of the mystics (Tarnas 2000).

These rational ancient Greek conceptualisations deeply influenced the development of modern western thinking, including its depictions of consciousness and intelligence. This interpretation of Greek thought that was revived during the Renaissance and the Enlightenment would ultimately become one of the dualism of mind and matter, of rigid conceptualisations, and linear and sequential thinking. Yet the metaphysical predilections of the ancient Greeks would not endure to the same degree. The transcendent mind of Plato and Socrates, including the divine and transcendent nous which even Aristotle embraced, would become a footnote; while the rationalism of Aristotle would fill the main pages of university texts.

"Rational" Christianity and the suppression of the mystical

The development of modern science was also indirectly influenced by Christian theology. The idea that the world has a rational and coherent order, that the world is a machine, and that a divine being created the world according to "number, weight and measure", are all medieval themes elucidated by Christian clerics and philosophers (Huff 2003: 40-41). Indeed, the idea of laws of nature has Judeo-Christian groundings. Both Newton and Copernicus held a realist interpretation of the world, founded on the theological belief that men are imbued with reason and conscience, empowering them to find "subjective certitude beyond objective demonstration" (Nelson 1991: 158-159).

The theology of St Augustine (AD 354-430) was crucial (Ross 1993; Wilber 2000b: 372). Augustine's was a decidedly "otherworldly" philosophy, deriding the body and sexuality as evil and as being of original sin (Rohmann 1999: 33). Augustine also denied the feminine, a cornerstone of mysticism (Ross 1993). Later scholasticism would dominate Christian theology, from about 1000 to 1500. Its prime method was the *scholastica disputatio*, whereby faith was subjected to reason via questioning and evidence. Scholasticism formed the foundation of all schooling and university education up till the twentieth century (Rohmann 1999: 353). Notably, the scholastics leant heavily on classical philosophers, especially Aristotle, and early Church fathers, particularly St. Augustine

(Rohmann 1999: 353), Copernicus, Galileo, Tycho Brahe, Kepler, and Newton were all products of the procrustean and scholastic universities of Europe (Huff 2003: 344).

Christianity has strong pagan, and animistic roots (Frazer 1914). Shamanism, visionary experience and prophecy were all apparent in early Christian thought and practice (Sheldrake 1994: 185). However, orthodox Christianity came to discourage mystical experience. The Church, both Protestant, and Catholic, denied the body and the experience of mysticism.

The dualism of Plato and the ancient Greeks was adopted by the early Christian Church, with matter seen as lower and the divine as higher. From the time of Augustine to the time of Copernicus, the Church valorised the divine and the angelic, but reviled the body and the Earth. The Church "held out the goal of perfect Ascent in Christ" while simultaneously "prohibiting it" (Wilber 2000b: 419), discouraging spirituality as "an ongoing living experience" (Ross 1993: 41). Indeed it repressed Gnostic Christianity (which was prominent up until about 300AD) and mysticism, which not only saw gods and the divine in nature, but encouraged the development of personal spiritual experience as a source of knowledge (Ross 1993: 41). Instead a "theological elitism" prevailed, with the clergy as the source of revealed wisdom. This put the divine beyond the reach of the common people. In effect the physical world was "despiritualised" (Ross 1993: 41).

In medieval Europe the Church rejected and persecuted those who practiced or preached ideas such as the immanence of God, accessibility to divine intelligence (and not via the revelation of the clergy), and pagan and druidic rituals and philosophy in general. Witchcraft, a form of paganism, was persecuted by the Roman Catholic Inquisition in Europe, while in America the Puritan clergy often targeted strong and independent women. The rejection of mysticism meant that western ways of knowing remained centred upon external modalities; the world of the senses, rather than the internal world of consciousness (Ross 1993: 150).

The Protestant reformation was itself deeply influenced by Augustinian thought. Martin Luther (1483-1546), the prime instigator of the Protestant reformation (Rohmann 1999: 239) was an Augustinian monk. The reformation reinforced an "intellectualised" way of knowing, based on biblical interpretation, not union with the divine. This theology established "a great faith in reason" (Huff 2003: 6).

The re-introduction of Aristotle in the 11th and 12th centuries

A shift in locus of power from clergy to scientist occurred over several centuries, and this shift both featured (and was mediated by) the continued shift towards predominantly rational ways of knowing. Huff writes that:

> What laid the foundations for the scientific revolution was Europe's unique synthesis of Greek philosophy... Roman law... and Christian theology (Huff 2003: 317).

Huff (2003) argues that the introduction of Aristotelian thought into Europe in the eleventh and twelfth centuries was the real point at which scientific rationalism emerged (Huff 2003: 19). Huff argues that there was a powerful intellectual and social revolution beginning at approximately the twelfth century. Reason and rationalism were valorised as a means to truth, something which was "deeply embedded in the vocabulary and discourse" of the Europeans of this period (Huff 2003: 187).

Huff states that this shift:

> *...was both sponsored by and motivated by the idea that the natural world is a rational and ordered universe and that man is a rational creature who is able to understand and accurately describe the universe. Whether or not men and women can solve the riddles of existence, so this view goes, they are able to advance human understanding mightily by applying reason and the instruments of rationality of the world we inhabit (Huff 2003: 1).*

Further, the organised skepticism associated with science began no later than the twelfth to thirteenth centuries. Biblical criticism was common in schools and universities, where rational demonstration was valorised and

believed to grant humanity the capacity of comprehending the universe and nature "with or without the aid of Scripture" (Huff 2003: 340).

At this time the shift in university education was a direct result of the re-introduction of the Aristotelian emphasis upon "explaining the world in terms of fundamental elements, causal processes, and rational enquiry" (Huff 2003: 339). For this was the cornerstone of the arts curriculum through which students passed before studying the higher faculties of law, theology and medicine (Huff 2003: 339). This system was still in place when Galileo, Kepler and Copernicus were developing modern physics and astronomy (Huff 2003: 339). By the twelfth and thirteenth centuries European universities were establishing a scientific curriculum "within neutral zones of intellectual autonomy which allowed philosophers and scientists to pursue their agendas free from the dictates of the central state and the religious authorities" (Huff 2003: 317-318). This represented a new naturalistic, intellectual agenda: an open forum, where scholars could ask questions, and indeed they were taught how to do so (Huff 2003: 318).

Between the eleventh and fourteenth centuries, in order to aid the teaching of astronomy in universities, the "corpus astronomicus" (new scientific knowledge which included standard texts, scientific instrumentation and collections of data). was also introduced. Thus a new "arithmetic mentality" emerged (Huff 2003: 346).

A parallel legal revolution led to the creation of new forms of social interactions, group and social agency, as well as new areas of autonomy in the intellectual and political domains. Notably:

> *This revolution also sharply demarcated the religious domain - the moral and the ethical - from the secular state. Not least of all, these changes created both the legal and institutional foundations for the emergence of professional associations of physicians, lawyers, merchants, and, eventually, scientists" (Huff 2003: 317).*

We thus see a number of processes occurring to facilitate the further development of rational ways of knowing. Open discussion and debate allowed for individual thought, thus enhancing individuality and ego-centered autonomy. Separation of the religious and secular meant that institutions and individuals were no longer burdened with the need for spiritual and mystical considerations. This represented a freeing of control of the Church, and allowed the intellectual mind and scientific method to flourish. However it also moved those very institutions and the populace further away from spiritual conceptions and intuitive ways of knowing.

The Copernican shift

The heliocentric universe as posited by Copernicus (1473-1543) was not only an intellectual shift - it was a metaphysical one which determined whether "the decision regarding truth and certitude could be claimed by anyone who was not an officially authorized interpreter of revelation" (Huff 2003: 183). As Grof (1985) states, paradigms delimit not only conceptions, but also the methods of enquiry and ways of knowing. After the Copernican revolution, the scientific method became the final arbiter of the real in western culture, and the study of scientific ideas became the core of the university curriculum (Huff 2003: 183).

Critically, the development of the scientific method further shifted the western world's dominant ways of knowing. Phenomena which were not easily measured and observed effectively became less real, and intelligibility was seen as being found in the observation of matter (Ross 1993: 41; Grof 1985: 19). This affected the representation of consciousness itself, which was essentially ignored until the very last years of the twentieth century because of its intangible nature (Blackmore 2001; Maddox 1998: 2-3). The interplay between observation and explanation was made more explicit with the clarification of scientific method. Extra-sensory phenomena began to be left off the map. To this day a theory is not deemed a valid explanation unless it has been tested by observation or experiment. Thus all phenomena demand a physical explanation, and this includes the working of the human brain (Maddox 1999: 2), a factor which has made both the examination and representation of integrated intelligence

highly problematic within modernist science.

Thus with the coming of the enlightenment, a new philosophy emerged, based upon reason and sensory evidence. As Panek (2000) writes of the new astronomers such as Galileo:

> *(they)... trusted in evidence from the telescope, but they trusted in it even more when it didn't depend on the interpretation of the observer; when it was answerable to the higher power not of ancient authority, or even to God, but of Nature; when it was quantifiable, measurable, replicable, absolute – when it was, in a word, mechanical (Panek 2000: 85).*

Thus in a matter of decades, the Church, which had stripped away inner knowing with its denunciation of Gnosticism and mysticism (Ross 1993), and replaced it with the divinity of the priesthood, had itself been usurped as the arbiter of ultimate knowledge (Dossey 1993; Laura and Leahy 1988). Within two centuries after the positing of the heliocentric universe, "man had gone from being the apple of God's eye to being God's eye" (Panek 2000: 61).

The differences between the mechanistic representations of consciousness that are depicted in mainstream science, and the holistic representations seen in many traditional mystical and spiritual philosophies, are a direct result of the application of their polarised ways of knowing. The ancient mystics of India, Tibet, Kashmir, Japan, China and Europe, used first person methodologies, and wrote extensively about consciousness. They revealed a set of general principles considered "empirical" by some (Wilber 2001; Kafatos & Kafatou 1991: 3). Thus in the East, looking in and seeing out were considered complementarities (Kafatos and Kafatou 1991). There was no negation of inners as is now found in Western science.

Another crucial issue was that a definite dualism emerged at the birth of the scientific era. Cartesian dualism depicted mind as separate from matter (de Quincy 1999). Descartes saw mind/self as knowable in isolation from others, primarily via observation and analysis (Owusu-Bempah & Howitt 2000: 38-39). Descartes' dualism was integral to the birth of Newtonian science and its mechanistic and materialistic predicates (Ross 1993: 42).

Cartesian dualism implied a split between humanity and nature, and between the individual and society. Kafatos and Kafatou argue that this damaged the "very ideals" of Western culture (Kafatos and Kafatou 1991: 17). Further, the new science was incapable of answering deep questions about the meaning of life and each person's place in society (Kafatos and Kafatou 1991: 17). This estrangement from the greater society mirrored a parallel alienation from the whole at a psychic level, as consciousness became increasingly self-fixated, and the processes of cognition became externalised and alienated from the inner dimensions of the psyche. Ultimately, mystical states of consciousness would come to be termed "nonordinary" (Grof 1985) or "altered" (Tart 1972), thus consecrating the status of intuitive and integrated perception as "other".

The enlightenment was ultimately a victory for the materialists who rejected transcendent phenomena. All "other worlds" were denied (Wilber 2000b). The spiritual basis of Western society, which had been built upon the philosophy of Christ, was attacked and ultimately dismantled by the scientific community. This severed the link between the divine and humanity and nature (Kafatos and Kafatou 1991: 17). The result was that "there was no way to actually reconnect the self with a "holistic cosmos." (Wilber 2000b: 370). Enlightenment space ultimately banished all hierarchy, non-locality and divinity from the cosmos in favor of a clockwork, mechanistic atomism.

Zohar (1994) argues that prior to Descartes, thinkers had used reason to ask fundamental questions such as what were the most important values, and what constitutes a good life (Zohar 1994).. Ideas were judged as rational according to whether they made sense within a holistic and broader context. However, after Descartes and the seventeenth century rationalists, reason became associated with logic and mathematical truth.

The rationalists versus the empiricists

The enlightenment debate between the

rationalists such as Descartes, and the British empiricists such as Thomas Hobbes and John Locke established a precedent that is still seminal in consciousness and intelligence theory in the contemporary world (Gardner et al. 1996: 33). Locke and Hume argued that the contents of the mind could be explained entirely in terms of sensory inputs. Their argument was predicated upon the idea of the mind as "tabula rasa" or a blank slate, with the environment determining mind and personality (Ross 1993: 115). These assumptions would be echoed in the early to mid years of the twentieth century, when behaviorists postulated similar notions (Ross 1993: 115). Notably Hobbes' and Locke's individualistic and fragmented representations of mind and self became the philosophical basis of the western state (Owusu-Bempah & Howitt 2000).

Kant, like other rationalists, argued that the mind lacked a material substrate, and thus could not be examined empirically. Yet he also held the view that knowledge was dependent upon sensory experience. He claimed that the ways that this knowledge is acquired is innately determined. Kant's ideas formed a vital and influential impact upon various branches of psychology such as Piaget's developmental conceptions (Gardner et al. 1996: 35-36).

The instruments of reason

As western science developed, both questions and answers were largely driven by the developments of a new instrumentation (Jardine 2000: 9). The ideas that were generated quickly began to spread to other disciplines: botany, geography, geology, mineralogy, zoology, physiology and pharmacology (Panek 2000: 73).

At the beginning of the scientific revolution, the Copernican model had placed the sun at the centre of the universe (Panek 2000). The effect was great. Before the publication of Galileo's *Sidereus Nuncius* in 1610 the Copernican universe stretched as far as Saturn, with the sun as the centre of the universe. At the beginning of the twentieth century, the universe had expanded until it had become "exactly one galaxy big" (Panek 2000: 123); and by January 5th, 1996, that number had expanded by approximately forty billion times, the number of estimated galaxies revealed by the Hubble Space Telescope (Panek 2000: 1).

Prior to the invention of such instruments, the frontiers of knowledge had belonged to philosophers and sages, predominantly employing what Wilber (2001) refers to as the eyes of reason and contemplation. However Wilber points out that the map of reality which emerged from the enlightenment depicted the universe in "empirical and monological" terms (Wilber 2000a: 226). This included a "well intentioned but deeply confused attempt to understand consciousness... by putting (it) under the microscope of the monological gaze" (Wilber 2000a: 226). The result was the evaporation of all "interior depths" because they could not be seen with reductionist apparatus. Thus "they were pronounced nonexistent or illusory or derivative or epiphenomenal – all polite words for 'not really real'" (Wilber 2000a: 226). Apparatus commonly employed in modern brain research - such as magnetic resonance imaging equipment and the electroencephalograph continue this process.

Galileo, Newton, Kepler and the enlightenment "scientists" shifted the focus and the power firmly back to the sensory-motor domain, aided by the advanced instrumentation and mathematics which they employed. Galileo stated that he placed his faith "not in ancient tomes, but in close observations and personal consecration..." (quoted in Panek 2000: 72). It was sensory evidence of "the great book of nature" that became the ultimate purveyor of truth (quoted in Panek 2000: 72).

The telescope, the microscope, the spectroscope, and ultimately computer-aided means of information processing took human perception from inners to outers; the cosmos became closer even as inner worlds diminished. The world of faith, divinity and even philosophy was relegated to secondary status, and often derided as limited, irrelevant or even dangerous (Panek 2000).

Industrialisation, secularism and the ego

The influence of the industrialisation of western society and emergence of the secular state had a profound effect on the western mind and its relationship with nature, the cosmos and the divine. Such effects have included the establishment of an increasingly utilitarian education system, the desacralisation of space, and the reinforcement of ego-centered consciousness - all of which contributed to the entrenchment of the western rationalist hegemony.

The great growth of urban centers and their industries during the industrialisation of society created a demand to identify and train individuals with the capacity to manage the social and economic challenges that were occurring (Gardner et al. 1996: 41). This would eventually lead to the development of "techno-science" (Pickstone 2000), which in itself would radically alter the way that humanity saw itself, and the universe (Pickstone 2000) and contribute to the entrenchment of the hegemony of rationality.

The industrialisation of society compounded the movement towards ego-centered, individualistic and competitive modes of consciousness and their preferred rational ways of knowing. It "bred the philosophy of atheistic materialism" (Ross 1993: 35). Comparisons can be made with the mechanistic paradigm, which "endorses individualism, egoistic emphasis, competition, and the principle of 'survival of the fittest'" as normal and healthy. Cooperation, synergy and ecological factors are not assigned value in this model (Grof 1985: 27; also Loye 2004b).

This individualism and egoism was compounded by the separation of church and state (Laura and Leahy 1988). No longer were spirituality and God the focus of the typical person's life. Christian theology was questioned, and the individual became the center of the universe (Kafatos and Kafatou 1991: 17). Divine medieval space was replaced with a more mundane perspective. In order to validate commercial enterprise, various thinkers (most notably Adam Smith) developed critiques and political ideologies which supported commercial enterprise. These ideologies undermined the validity and power of the estate-based society, with its static, hierarchical and divine predicates (Shapiro 1992: 13). According to Shapiro, the effect of Adam Smith's work was the replacement of "piety with calculation" (Shapiro 1992: 13). Later, the development of early psychology and behaviourism would be deeply influenced by "the exploratory and exploitative drives of nineteenth century capitalism" (Ross 1993: 116).

The modern secular state not only eliminated hierarchical social structure, but also rejected the spiritual and metaphysical framework upon which it was predicated. The focus became economy and work, and mathematical and abstract modes of operation became institutionalised even as "calculation" superseded divination.

The Present: Towards the modern mind

By the mid-eighteenth century at the dawn of the modern era, scientific knowledge in western society had developed predominantly rational ways of knowing - classificatory, experimental, linguistic/philosophical, and mathematical. The door was then open for empirical science's rational ways of knowing to entrench their hegemony on the various discourses on life (biology), mind (psychology) and intelligence.

Biology and the mechanisation of life and mind

Mechanistic assumptions came to dominate biology and thus biological perspectives on consciousness (Dossey 2001; Grof 2000), and modern cognitive psychology became "a handmaiden to neuroscience" (Maddox 1999: 278).

The mid nineteenth century publication of Darwin's theory of evolution had a massive impact upon biology, science in general and also upon ways of knowing (Gardner et al. 1996: 39; Maddox 1996: 18). Darwin permanently changed humanity's perspective of its place in nature by demonstrating that all life on the earth is the product of the same processes -

chance variation and natural selection (Maddox 1998: 235). By the mid-twentieth century the neo-Darwinian paradigm became "entrenched seemingly beyond all contesting in the textbooks from grade school through graduate studies" (Loye 2004a: 6). The theory confirmed a link between humans and great apes and nature in general, and needed no place for God. It thus reinforced the Copernican Principle (Grof 1985: 21; Maddox 1998: 7). Notable is the paradigmatic exclusion of the contribution to the initial development of evolutionary theory by Darwin's contemporary Alfred Wallace, who "fell from scientific favor" by engaging in "dubious interests" such as spiritualism and the possibility of alien life (Bryson 2003: 389).

The work in genetics of Mendel helped establish modern biology, and like Pasteur's work, represented a further vindication of reductionism and focus upon the world of the very small. The inevitable implication from Mendel's work was that cells are the essential units of living things (Maddox 1998: 18). Specifically Mendel's concept of dominant and recessive genes was significant, as it enabled the mathematical prediction of inherited characteristics (Gardner et al. 1996: 53). Notably, Mendalian conceptions became a popular way to describe human characteristics, including intelligence (Gardner et al. 1996: 54).

Crick and Watson's construction of a DNA molecule in the 1960's had a tremendous and pervasive effect upon science in general, and especially biology, psychiatry, and thus psychology (Maddox 1999: 20). Indeed the practical and intellectual implications of the structure of DNA "are without precedent in the whole of science" (Maddox 1999: 20). When Crick and Watson built their model of the DNA molecule, ontogeny had finally been brought within the bounds of rational enquiry (Maddox 1999). Writes Maddox:

> *That was the springboard for a detailed explanation of what has proved to be the universal bio-chemical machinery of living things, which continues still at breakneck pace (Maddox 1999: 20. Italics added).*

The death of vitalism, animism, pantheism, panentheism and mysticism was seemingly complete; for finally the random mutation of the gene - seen as the overriding "driving force" of nature (Dawkins 1976, 1987) - was then made material, sensible and therefore observable and empirical.

Thus in the nineteenth century and beyond "How?" become the overriding question, not "Why?" (Maddox 1999: 9). The very questions upon which spiritual discourses were founded had been rendered effectively obsolete by reductionist biology and the dominant rational ways of knowing which underpinned it. The alternative musings of the romantic movement throughout the eighteenth and nineteenth centuries were ignored within dominant scientific discourse at this time. This included the romantics' valorisation of affective experience, individual subjectivity and the "transmuting power of the relationship between subject and object" (Buckley 2001: 458).

The beginnings of modern psychology and intelligence theory

Kant insisted that consciousness could not be studied objectively. Yet later anatomical and physiological investigations of the nervous system revealed clear links between human abilities and brain structure (Gardner 1996: 36, 37). The period from the 1860s until the early 1890s saw the wide deployment of experiments using complication tasks, reaction times and the subtractive procedures (Gardner 1996: 37).

The research of German anatomist and phrenologist Francis Gall (in the early nineteenth century) implied that the development of the cerebral cortex was linked to enhanced human and mammalian capabilities. Other European physicians and scientists were revealing the relationship between brain damage and impaired mental and linguistic functions. These individuals included Marc Dax, Paul Broca, Carl Wernicke, and Hermann von Helmholtz (Gardner 1996: 36-37). When Helmholtz demonstrated that nerve impulses travel at 100 metres per second, he effectively grounded the brain, and thus consciousness in the physical world. The way was then open to research the mind at a physical level, in line with the tenets of western materialism (Gardner 1996: 36-37).

William Wundt, in part, attempted to study consciousness empirically. For Wundt even religion, language and customs could be explained as consisting of "elements." Individuals were the units that developed culture and transmitted it from one generation to the next, moving from simpler to more advanced cultures over time (Gardner 1996: 38). Wundt's empiricism mirrored the methodologies of physics, and was a seminal incursion point of mechanistic paradigm into psychological theory, as his methods were widely copied throughout Europe and North America (Gardner et al. 1996: 38). Yet notably Wundt's more humanistic *Volkerpsychologie* (cultural psychology). was largely forgotten as American psychology became predominant; a process which would later be mirrored in the Americans' over-emphasis of the rational components of Freud and the downplaying of his spiritual predilections (Bettleheim 2001).

Francis Galton's work in the mid to late nineteenth century was crucial in developing intelligence and aptitude tests. He applied statistics to the study of intelligence, a trend which continues to this day. These tests focused on sensory modalities (Gardner et al. 1996: 51). Meanwhile Alfred Binet was more interested in comprehension, judgment, and the capacity for reason and inventiveness (Gardner et al. 1996: 49). Notably, these two psychologists avoided any deeper reflective processes that might require introspection or even mildly non-ordinary states of consciousness. The tendency of some of those who later employed Binet's tests was to interpret the IQ score as a single universal measure of intelligence of an individual. The IQ score became "reified" (Gardner et al. 1996: 50).

Freudian psycho-dynamics have also profoundly influenced contemporary understandings of the human psyche (Vandermeer 1996). Like the behaviourists, Freud's model was essentially linear and one of stimulus and response, but with the unconscious and its intricacies as the focus (Goleman 1986: 57-60). Notably, Freud failed to account for transpersonal experience (Grof 1985, 1992). Freud's major contribution to knowledge is his tool of free association, (Wilber 2001: 52) an interrogative process which mirrors the Socratic method, and is still the basic tool of psychoanalysis. Significantly, by mid century Freud's more humanistic and spiritually inclined contemporary Carl Jung was widely rejected in academia and even derided, reflecting the predominance of mechanistic thinking (Ross 1993).

Towards the mid-twentieth century

The emergence of behaviourism had a vital influence upon the development of psychological theory and practice in the twentieth century (Dossey 1999; Gardner et al. 1996; Ross 1993: 112-113). It emerged in a time of dominance of mechanistic thinking, where "science was focusing its materialistic analytic beam on just about everything" (Ross1993: 115). At this time all mind was being reduced to matter by mainstream scientific thought and represented as materialistic epiphenomena (Ross 1993: 115). In psychology introspectionists' claims were being attacked as subjective, and it was thought that self-articulated reports of one's own consciousness were not dependable. Instead, objective verification, modeled on the data-specific disciplines of physicists and chemists were felt to be more accurate (Gardner et al. 1996: 52). Behaviourists wanted to make psychology rigorous and scientific, and avoid nebulous ideas such as "plans, images, consciousness, schemata, thoughts, ideas and the mind" (Gardner et al. 1996: 52). It denied the mental and spiritual; and even consciousness in totality - "an audacity which could only have been countenanced in a society falling into the hypnotic trance of atheistic materialism." (Ross 1993: 112). Behaviourism was an almost perfect projection of the mechanistic paradigm, where "the human organism is viewed as a rather complex but totally reactive mechanism" (Wilber 2001: 50).

The conceptions of Jean Piaget have deeply influenced developmental psychology, and so have the information and computer models of consciousness. Yet Piaget made no attempt to observe or measure any effect or process involving spiritual or reflexive inner dimensions. Piaget used the scientist as the basic model of the learner (Gardner and others

1996: 113). Piaget's *method clinique* was a dialogical question and answer method modeled from Freud (Wilber 2000b). Thus the process was heavily verbal/linguistic, and did not allow for the non-ordinary states of consciousness which facilitate mystical experience. In the wake of the successes of Piaget, other researchers such as Kohlberg, Loevinger, Broughton, and Maslow also employed a dialogic approach (Wilber 2001: 54), thus perpetuating a method which often obfuscated the inner, the intuitive, and the transpersonal.

The neuroscience which dominates modern cognitive psychology was becoming well established by 1949, when psychologist Donald O. Hebb declared a finding that remains the dominant position in neuroscience (Dossey 1993).

> *Modern psychology takes completely for granted that behavior and neural function are perfectly correlated. There is no separate soul or lifeforce to stick a finger into the brain now and then and make neural cells do what they would not do otherwise... One cannot logically be determinist in physics and biology, and a mystic in psychology (Dosse 1993: 138).*

Hebb's materialistic position that the machinations of individual brains and consciousness itself are inseparable remains the foundation of physiological psychology (Dossey 1993: 139). The lineage has continued into recent times. Francis Crick epitomised this with his "astonishing hypothesis" that "everything about you" and "all aspects of experience ...can be explained by neurons." (BBC 2001; Crick 1994). In this way psychology (and thus intelligence theory) has been restricted by the very same parameters that have increasingly restricted theories of consciousness and the mind - only fixed, measurable, isolated and preferably microscale entities are permitted to qualify as causal; and the neuron is the perfect fit.

Ironically it has been the publication of Crick's *Astonishing Hypothesis* (1994) which has been crucial in the re-introduction of the concept of consciousness into recent scientific discourse (Maddox 1999). Notably, it is Crick's mechanistic hypothesis and his methods (microscale focus upon the neuron) that established the validity of his thesis within dominant consciousness discourse. This epitomises the self-perpetuating and self-obfuscating hegemony of dominant paradigms in general: only when a conception conforms to the paradigmatic parameters, and is explicated via its preferred ways of knowing, and shaped according to the agreed upon preconceptions, will it be acknowledged as legitimate. In short, Crick's hypothesis is not at all astonishing. Its lineage can be traced back through the history of western civilisation

Summary

Thus within the dominant reductionist methods of neuroscience and its handmaidens, mainstream dominant cognitive psychology and intelligence theory, the concept of integrated intelligence has effectively been excluded. For in such a science there is no intelligence as a property of the individual - only as a description of behaviour (Nash 2005: 7) or as an emanation of the neuron, as verified through experiment. The introspectionists and the mystics remain largely silenced.

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Notes

1. See Anthony (2005a) for an expanded explanation.
2. See Anthony (2005b) for more on the concept of receptivity..

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