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A Brief History of Holons

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This concept has a long and respectable ancestry. So much so that defenders of orthodoxy are inclined to dismiss it as "old hat" - and often in the same breath to deny its validity. Yet I hope to show as we go along that this old hat, handled with some affection, can produce lively rabbits.
(Arthur Koestler, 1967, p.45)

Introduction

The idea of hierarchy and of their constituent part-wholes, or holons, has, as Arthur Koestler points out in the opening quote, a long and distinguished history. There are many philosophers who have proposed abstract systems for explaining natural and social phenomena. In pre-Socratic Greece Leucidus and Deocritus developed the abstract concept of the atom and used it to develop a philosophy that could explain all observed events. Aristotle used hierarchy as the methodology for accumulating and connecting biological knowledge. Hierarchy was perhaps the dominant way of viewing the connection between the natural, the human and the supernatural orders of being through the middle ages. In the 17th century Leibniz proposed his "monad" as an irreducible unit for explaining not only the material world but the inner world of the soul.

In the early twentieth century there was a flurry of interest in holism and hierarchy that owed its genesis to the impact of Darwin's evolutionary theory. I think the contribution of Jan Smuts in his publication of "Evolution and Holism" in 1926 is particularly important. Smuts was a soldier, a revolutionist republican, a lawyer, the Premier of the Republic of South Africa for several years (before the instigation of political apartheid), a globalist, and one of the founders of the United Nations. He also was a philosopher who saw the deep connections between the natural and social worlds and his concept of holism clearly influenced Wilber's ideas in this area. Wilber quotes Smuts at the very beginning of his first major work that fully utilised the concept of hierarchy – "The Atman Project" - "Everywhere we look in nature we see nothing but wholes" (cited in Wilber, 1980). While all these various threads of ideas included the consideration of hierarchical networks and levels and orders of development it was not until the work of writer-philosopher Arthur Koestler that a fully theory of holarchy and holons was proposed.

Arthur Koestler – The father of Holon theory

Some 35 years ago, in 1967, Arthur Koestler proposed the term "holon" in his book "The Ghost in the Machine". Arthur Koestler was born in 1905 and died in 1983. During the 1930's and 1940's Koestler was a journalist who covered the Spanish civil war and World War II from the perspective of the ordinary people who were swept up in the great social tumult of those times. After the war he turned to writing books in both fiction and non-fiction genres. He was one of the most widely read political novelists of all time. Koestler said that he wrote his novels, "out of my quarrels with the human condition". His other non-fiction books, including, "The Ghost in the machine" were "attempts to analyse that same condition in scientific terms".

Like Jan Smuts, Arthur Koestler led an extremely eventful life and he participated fully in some of the most important political and social events of his times. Again, similarly with Smuts, Koestler's engagement with the events of the day included not only social action and participatory involvement at a personal level but he also lived a life of deep connection with the world of culture and inner experience. In the following quote from his book, "The Act of

Creation", Koestler is referring to the relationship between subjective and objective knowledge quests and it shows the awareness he had of both interior and exterior aspects of life.

Einstein's space is no closer to reality than Van Gogh's sky. The glory of science is not in a truth more absolute than the truth of Bach or Tolstoy, but in the act of creation itself. The scientist's discoveries impose his own order on chaos, as the composer or painter imposes his; an order that always refers to limited aspects of reality, and is based on the observer's frame of reference, which differs from period to period as a Rembrandt nude differs from a nude by Manet.
Arthur Koestler, 1970, p. 253

It is interesting to look at Koestler's life in terms of Wilber's Quadrants framework. He was a philosopher and held a rich interest in art and cultural concerns. He was active socially and for many years was involved in various social movements and was nominated for the Nobel prize for literature three times. His personal life was one of great behavioural involvement with the great dramas of revolution, war and social dislocation that characterised the early and middle twentieth century. He also explored the inner worlds of subjective experience and imagination and wrote some of the most memorable political novels of his times. Looking at his life it is clear that his great span and depth of involvements and experiences should be reflected in his philosophy and in the specific detail of the holon theory that he largely created.

Koestler's Holon

The idea of the holon occupies a central position in Koestler's thinking about the human condition. He developed the construct to deal with three central problems that he saw facing the social sciences of the post-war generation. First he saw the need for some model that could unite and integrate the reductionist and mechanistic worldview of the "scientific" and behavioural psychologies with the holistic and humanistic worldview of the Freudian, Rogerian and Gestalt psychologies. Second, he recognised the importance and relevance of evolutionary processes in the social sciences and wanted to provide some theoretical system that could apply evolutionary conceptualisations to both realms. Third, he wanted to develop a model of human social systems that was equally at home in analysing the micro-level of individuality and the macro-level of collectivity. He wanted to propose some basic model of explanation that was relevant across the great span of human activity and involvement.

Koestler acknowledged that his "holon" construct had, in fact, a very venerable and ancient ancestry in western philosophy. Several important philosophers including Leibniz and Hegel had drawn attention to the importance of such things as hierarchy and developmental levels. Koestler saw himself in a line of such thinkers who wanted to bring together different knowledge quests and schools of scientific endeavour instead of pursuing the ongoing specialisation in scientific knowledge that has characterised modern scientific schools. Holon theory was Koestler's attempt at an integrative philosophy of science and he expected that the holon theory or something similar would form the basis for any truly holistic future scientific worldview. He approvingly quotes one Needham who said that, "The hierarchy of relations ... will perhaps be the leading idea of the future".

So, the holon construct was no small thing for Koestler and it is clear that he regarded his holonic principles as a solid attempt at an integrative philosophy of human existence. So what is a holon. The word is a combination of the Greek "holos" meaning whole, with the suffix "on" which, as in proton or neutron, suggests a particle or part. The holon, then, is a part-whole. It is a nodal point in a hierarchy that describes the relationship between entities that are self-complete wholes and entities that are seen to be other dependent parts. As one's point of focus moves up, down, and/or across the nodes of a hierarchical structure so one's perception of what is a whole and what is a part will also change.

The evolutionary holon

In introducing the idea of the holon Koestler quotes the story told to him by Herbert Simon, a Nobel prize winner, and called the 'parable of the two watchmakers'. The parable goes like this:

There once were two watchmakers, named Bios and Mekhos, who made very fine watches. The phones in their workshops rang frequently; new customers were constantly calling them. However, Bios prospered while Mekhos became poorer and poorer. In the end, Mekhos lost his shop and worked as a mechanic for Bios. What was the reason behind this? The watches consisted of about 1000 parts each. The watches that Mekhos made were designed such that, when he had to put down a partly assembled watch (for instance, to answer the phone), it immediately fell into pieces and had to be completely reassembled from the basic elements. On the other hand Bios designed his watches so that he could put together subassemblies of about ten components each. Ten of these subassemblies could be put together to make a larger sub-assembly. Finally, ten of the larger subassemblies constituted the whole watch. When Bios had to put his watches down to attend to some interruption they did not break up into their elemental parts but only into their sub-assemblies. Now, the watchmakers were each disturbed at the same rate of once per hundred assembly operations. However, due to their different assembly methods, it took Mekhos four thousand times longer than Bios to complete a single watch.

Koestler relates this story to show that the hierarchical organisation of systems is an inbuilt feature of life – biological life but also any complex evolving system. not only is the time needed for the development greatly shortened when hierarchical methods are used but there are also inherent benefits in terms of maintenance, regulation and restoration. Koestler sees the hierarchical ordering of life as such a fundamental aspect of development that he says (1967, p. 47),

We do not know what forms of life have evolved on other planets in the universe, but we can safely assume that *wherever there is life, it must be hierarchically organised* (emphasis in the original)

Koestler wants to show two things with this parable. First, that complex systems will evolve from simple systems much more rapidly if there are stable intermediate forms than if there are not, i.e. if they are hierarchically organised. Second, and more importantly, he wants to show that the resulting complex systems will always be hierarchic and that hierarchy is the natural and ubiquitous outcome of the development of structural form. After establishing the universal importance of hierarchy to the development of complex systems Koestler went on to propose that these hierarchies could be analysed in terms of the stable intermediate nodes or forms through which their structure is defined. It was to these intermediate forms that Koestler conferred the new label of "holon".

Koester was a keen student of psychology and was well aware of the problems besetting the reductionist behavioural approaches to psychological theory. He was also conversant with the European schools such as the more holistic Gestalt psychology and he saw his holon theory as a way to move beyond the inadequacies of these contending models. He saw the great dehumanising effect of atomistic psychologies but also recognised the limitations of the holistic schools. As he puts it (1967, p.49)

in spite of its lasting merits, 'holism' as a general attitude to psychology turned out to be as one-sided as atomism was, because both treated 'whole' and 'part' as absolutes, both failed to take into account the hierarchic scaffolding of intermediate structures of sub-wholes ... the Behaviourist never gets higher than the bottom layer of stones, and the holist never gets down from the apex.

Koester saw holon theory as a broad philosophy of science that showed a way out of the interminable and centuries-long debate over the relative merits of reductionism and holism.

Holons and holarchies

Koestler noted that in every order of existence, from physical to chemical to biological and social systems, entirely self supporting, non-interacting entities did not exist. And more importantly, that entities can be seen to lie in holarchical relationship with each other. He called systems of such entities Open Hierarchical Systems (OHS) and these have subsequently been called holarchies. Every identifiable unit of organization, such as a single cell in an animal or a family unit in a society, comprises more basic units (mitochondria and nucleus, parents and siblings) while at the same time forming a part of a larger unit of organization (a muscle tissue and organ, community and society). A holon, as Koestler devised the term, is an identifiable part of a system that has a unique identity, yet is made up of sub-ordinate parts and in turn is part of a larger whole.

Koestler's holons were not thought of as entities or objects but as systematic ways of relating theoretical structures. In other words, holons were arbitrary points of reference for interpreting reality. To quote Koestler (1967, pg. 55), "Whatever the nature of a hierarchic organisation, its constituent holons are defined by fixed rules and flexible strategies" (emphasis in the original). So Koestler's holons are posited and "fixed" only out of the relational rules and strategies that help us make sense of reality.

Because holons are defined by the structure of a hierarchy each identified holon can itself be regarded as a series of nested sub-hierarchies in the same way that a set of Russian dolls is an inclusive series of dolls contained within each other. Holons are, then, both parts and wholes because they are always parts of larger hierarchies and they always contain sub-hierarchies. Holons simultaneously are self-contained wholes to their subordinated parts, and dependent parts when seen from the inverse direction. Hence, holons can be seen as reference points in hierarchical series or holarchies.

Koestler also recognised that holons are the representative stages or nodal structures that define the developmental hierarchies. As he says (1967, p. 61),

the different levels represent different stages of development, and the holons ... reflect intermediary structures at these stages.

It is this crucial stage-like characteristic of holons that Wilber takes up, expands and utilises in his spectrum model of human growth and later in his quadrants framework for describing Kosmic development. It is interesting to note that Koestler also recognised that the stage-like nature of hierarchies that existed in the inorganic world and in "the interplay of cohesive and separative forces in stable inorganic systems, from atoms to galaxies".

So, we see that Koestler not only introduced the nomenclature of holons but he also described their place in developmental theory and saw how they could be used to overcome many of the philosophical problems that were plagued the social and psychological sciences of the early twentieth century. Even more than this, Koestler developed a very detailed set of holonic principles that actually defined a new theory of social development and general evolutionary theory. These principles are outlined in an appendix to "The Ghost in the Machine" and are titled "General Properties Of Open Hierarchical Systems (O.H.S.)". Many of these principles have been taken up and expanded on by Ken Wilber in his holonic tenets but there are many that have not. Before comparing Koestler's OHS properties with the twenty tenets of Wilber I will give a brief overview of how Wilber has adopted the holon and how it fills a central role in his most recent writings on Integral theory.

Ken Wilber's Holonic Tenets

Wilber adopted Koestler's holon construct during, what Wilber has called, the phase-2 period in the development of his philosophy. This phase, which occurred around the late seventies and early eighties, is characterised by a focus on the spectral transcend-and-include nature

of all developmental structures. It is no surprise that Wilber would be drawn to the holon as a construct given his developmental interests and particularly his revolutionary pre/trans theorem which is so useful to unravelling the boundary stages of growth. So, it was quite early on that the holon construct was incorporated into the basic theoretical scheme Wilber's writings as a way of emphasising the hierarchical/holarchical nature of reality. To my knowledge, the first reference that Wilber makes to the holon construct is in his 1983 book, "Eye to Eye" but he may well have been aware of the term for some time. This was at least 15 years prior to the great expansion of his ideas that culminated in 1995 in the publication of "Sex, Ecology, Spirituality" (SES) which introduced the Four Quadrants of Kosmic evolution (Wilber's Phase-4). From 1995 the holon and its various defining qualities have held an increasingly important position in Wilber's writings.

Wilber holonic theory or as he refers to it "the twenty tenets" were first laid out in the opening chapters to SES. They provide the foundation for his mapping out of the All Quadrants, All Levels framework (AQAL). It is clear from the very beginning of SES that Wilber now regards the idea of the holon as the primary explanatory unit in his AQAL framework. This is conveyed in his famous statement that, "Reality as a whole is not composed of things or processes, but of holons". This groundbreaking statement sets the holon construct at the very heart of Wilber's whole explanatory endeavour. And, I believe, that this marks a major turning point in the history of Western philosophy of science and in our more general attempt to develop scientific explanations of social phenomena. The reason for this is because in clearly identifying the holon as the central unit of explanation Wilber provides a basis for connecting all fields of scientific and cultural knowledge.

Wilber's AQAL framework and the Holon

As with Koestler, Wilber uses the holon theory to, "undercut the traditional argument between atomism .. and wholism". For Wilber to incorporate holonic theory into the theoretical structure of the AQAL framework was easy at one level because both theories were founded on the idea of hierarchical inclusion. The difference between them was that Wilber's AQAL framework was a way of seeing the whole developmental and evolutionary nature of all relative knowledge, experience and activity. Wilber took Koestler's holon to its logical end and, placing within the AQAL framework, saw the holon as a way of analysing all aspects and domains of reality. The subtitle of SES is "The Spirit of Evolution" and to my mind the book is an attempt to bring evolutionary theory out of its traditional biological home and to apply to all levels of existence – from matter to spirit. Wilber does this through the identification of the holon as his core explanatory device. This is the absolutely crucial part that holons play in his model.

In taking up Koestler's wonderful theory of holons, Wilber too has stressed the sliding and contextual, yet hierarchical, nature of holons. Wilber has creatively used the holon construct to highlight the holarchical nature of his AQAL framework. The framework is derived from an immense amount of scientific, cultural and experiential knowledge. In adopting the holon construct the AQAL model becomes more than just a new way of connecting existing fields of knowledge in a developmental overview. It is also a new way of looking at the referential "units" of that knowledge - holons. Built into the heart of the model is the concept that all developmental phenomena can be viewed as aspects of dynamic, holonic events that are nested within a holarchy of evolving/involving structural patterns.

The holons construct is so critically important to the utility of the Integral model because it enables the AQAL framework to be focused on any point in the holarchy or, to put it another way, it enables any developmental event to be analysed in terms of an Integral methodology. As such, the concept of the "holon" does away with the endless quest of trying to find the fundamental parts or wholes that constitute reality and it releases us from the basis mythologies inherent in materialistic, mentalistic, animistic, relativistic, or idealistic conceptions of reality. Quantum physics, that most advanced of all natural sciences, now

overtly recognises the completely mythological nature of "matter" (Davies & Gribble, 1992), and of ideas that regard reality as simply permutations of solid substance, empty space, and linear time. The AQAL model, when it is used as an interpretive schema, extends this demythologising awareness across all explanatory systems (including itself) and brings to the fore the holarchic and developmental nature of reality. With the idea of a nested holarchy of holons, Wilber has opened a vision of reality that does not fall into the errors associated with various forms of reductionism, elevationism or relativism. In bringing Koesler's holon concept into his model, Wilber has not only opened up the possibility of a truly open-ended Theory of Everything but also a systematic theoretical approach towards any thing/process/event.

The holon - Integral theory's unit of analysis

The development of the human, in both its personal and social forms, is the most complex phenomena that we yet know about in the Kosmos. To understand this process in any sort of detailed and valid fashion is, to put it mildly, a big task. It is my opinion that Ken Wilber's Integral theory is the only philosophical/epistemological/theoretical framework that attempts to present a comprehensive understanding of the complex and multi-layered reality that we see about us. One of the most attractive central features of Integral theory is that it does not rely on ontological reductionism to simplify that complexity, as do many other branches of science. The neurologist and the medical specialist reduce the human to the biochemical with their unit of study being the chemical compound. The behaviourist reduces the human to physical action with their unit of study being the behavioural stimulus-response cycle. The cognitivist reduces the human to the world of behaviour and thought with their basic unit of explanation being the pattern of thought, belief or feeling. The evolutionist reduces it to reproductive advantage with the locus of explanation being the adaptive interaction between environment and phenotype. The sociologist reduces the human to the world of interpersonal relations and group dynamics with their focus of explanation being the social event. The humanist reduces the human to the world of being and identity with authenticity in word and deed being their centre of interest. The transpersonalist reduces, or more correctly elevates, the human to the world of spirit and finds explanation in the analysis of the mystical event.

All these disciplines simplify human complexity to find something of certainty, something that is true, something that will have lasting validity. And, in their own way, each of the main perspectives on human reality does contribute unique knowledge to the quest for understanding that so occupies us. As Wilber has often pointed out, all these contributions are partially correct. The human can be understood and explained through the study of the physical, the chemical, the animal, the social, the political, the cognitive, the existential, the spiritual, and the historical. Once this partiality is recognized, we are then faced with the problem of truly integrating the valid and the true of each and bringing them into some semblance of coherency. And the very first task that is required for this integrative endeavour to be successful is to identify a unit of analysis or explanation that does not privilege any of the units of analysis or explanation associated with partial views.

In my opinion it is one of Wilber's greatest insights that he has been able to identify an explanatory reference point that avoids the ontological pitfalls that have so plagued all previous explanatory elements. In so doing Wilber allows Integral theory to transcend (and integrate) all the reductionisms of the partial views to boldly propose that the true locus of explanation does not reside in any particular level of reality and cannot be limited to any single domain of investigation. The basic unit of analysis for Integral theory is not the atom, or the molecule, or the mathematical unit, or the interpretive perspective, or the cognitive pattern, or the historical event, or the spiritual revelation. For Integral theory the unit of analysis, it's basic point of explanation, analysis, reference and "measurement" is the holon. This is why students of Wilber work, if they are to understand what Integral theory/philosophy, the AQAL framework and IMP's are truly about, will have to have a good grounding in holon theory.

The reductive research paradigm has been immensely successful for investigating physical and chemical phenomena. More recently holistic approaches like the various systems theories, humanistic disciplines, and developmental theories have been successfully applied to social phenomena. The holon, the "part-whole", has a built in non-reductive perspective that allows for the simultaneous recognition that anything can be studied holistically and anything can be analysed reductively at the same time. This combination of holistic and reductive methodologies also introduces a new element and immensely important capacity for explanatory methodologies that utilise this part-whole focus of explanation. It now means that the various types of reductive science can now be carried out in relational context. The disciplines of physics, chemistry, biology, psychology, the humanities, sociology, theology, and cultural studies can now be pursued within a cross-disciplinary framework that connects and situates their disparate findings and truths instead of juxtaposing them. By allowing for both holistic and reductive methodologies, the holon framework introduces an integrative dimension of implementing those approaches that no other approach can claim. This new capacity lies at the heart of Wilber's (2002) recent call for a revolutionary Integral Methodological Pluralism (IMP) – "a project of synthesis".

Holism, reductionism and pluralism

The holon is the holarchic (i.e. hierarchic plus heterarchic) reference point through which the various principles of the AQAL model can be applied. This is the real point behind Wilber's first tenet of holons, "Reality as a whole is not composed of things, or processes, but of holons". He is really pointing out here that holons permit an analytical holism that can evade the reductive errors that result from explanations that rely on some fundamental thing or process. Unfortunately the wording of this tenet suggests that holons themselves are building block composites that in some way fit together to make up Kosmic reality. But this is not at all Wilber's intended reading for this tenet. The holon construct allows Integral theory and it's AQAL methodology to step away from and the methodological battles engaged in by other disciplines and to avoid the reductive pitfalls that abound wherever science seeks to understand complex phenomena. The use of the holon as the means for applying Integral theory also allows the many other truths that have been uncovered by human knowledge quests to be honoured and rightfully situated within a non-reductive context. It is not just that the holon in conjunction with the AQAL principles can investigate systemic and elemental aspect of reality but that it can also, as Wilber says, "acknowledge, honor, and include all authentic modes of human inquiry " (and their valid findings). In short, the full integration of the holon and the AQAL model enables Integral theory to overcome the traditional reductionist propensity to privilege very biased methodologies for gathering observations and experiences and very narrow modes of explanation for understanding them. As Wilber (2002) has recently said:

AQAL, then, is a metatheory that attempts to integrate the most amount of material from an integral methodological pluralism, thus honoring the primary injunction of an integral embrace: Everybody is right.

Everybody, i.e. all major theorists, philosophies and stores of cultural knowledge, are right (within context) and it is the holon construct that allows Integral theory to move without prejudice around these vast domains of human knowledge and pursue its agenda of holistic exploration and analysis. This process of acknowledging the validity and value of established personal and cultural knowledge quests can be viewed from a broader perspective than simply that of Wilber's integral theory. Wilber has recently termed any such endeavour as Integral Methodological Pluralism (IMP). Integral theory is an example of such an approach to the investigation of events, experiences, and knowledge. But I believe that any such method will need to be based on the holon construct in some form because it is the only explanatory concept that can accommodate the three definitive criteria for an IMP.

Similarities and Differences

I have pointed out that Koestler has proposed a quite detailed set of holonic principles and shown that the holon construct has a very wide application. Wilber, in turn, has placed the holon construct firmly at the centre of his comprehensive integrative framework for connecting knowledge. Wilber has expanded holon theory into a new approach to understanding the relationship of many different knowledge domains. It should, however, be noted that Koestler provided Wilber with much more than just a new term to label the "building blocks" of his Integral theory/AQAL framework. Koestler's principles of Open Hierarchical Systems (OHS) and Wilber's twenty tenets are clearly very related and the following table shows the correspondences between the two types of holon theory.

Table 1: Correspondences between Koestler's OHS principles and Wilber's twenty Holonic Tenets	
Wilber's Twenty tenets	Koestler's OHS principles*
1: Reality can be seen in terms of an endless series of holonic relations	1.3 Parts and wholes in an absolute sense do not exist in the domain of life. The concept of the holon is intended to reconcile the atomistic and holistic approaches. "The [holarchy] is open-ended in the downward, as it is in the upward direction"
2a: Holons have agency, individuality, deep autonomy	4.1 Every holon has the ... tendency to preserve and assert its individuality as a quasi-autonomous whole; 9.2 the holon's agency is that which controls the part from the next higher level.
2b: Holons have communality, mutuality, and collective relationships	4.8 The canon of a social holon represents not only constraints imposed on its actions, but also embodies maxims of conduct, moral imperatives and systems of value.
2c: Holons have a capacity for self-transcendence, and active transformation into greater wholes	5.6 A holon on the n level of an output-hierarchy is represented on the (n+ 1) level as a unit, and triggered into action as a unit. A holon, in other words, is a system of relata. which is represented on the next higher level as a relatum.
2d: Holons have a capacity for self-immanence, and the active integration of its parts	4.1 Every holon has the tendency to function as an integrated part of an (existing or evolving) larger whole. 4.1 a holon's Integrative (INT) tendencies are inherent in the concept of hierarchic order and a universal characteristic of life. The INT tendencies are the dynamic expression of the holon's partness.
3: Holons emerge creatively and indeterminately	8. Holons on successively higher levels of the hierarchy show increasingly complex, more flexible and less predictable patterns of activity. while on successive lower levels we find increasingly mechanised stereotyped and predictable patterns.
4: Holons emerge holarchically, i.e. through dynamics between hierarchy and heterarchy	6.1 Hierarchies can be regarded as 'vertically' arborising structures whose branches interlock with those of other hierarchies at a multiplicity of levels and form 'horizontal' networks.

5: Each emergent holon transcends but includes its predecessors	“ A hierarchy of holons should rightly be called a holarchy”
8: Each successive holon level within a holarchy produces greater depth and less span	2.2 The number of levels in a hierarchy is a measure of its "depth", and the number of holons on any given level is called its "span".
12a: Evolution displays increasing complexity	8.4 Each upward shift is reflected by a more vivid and precise consciousness of the ongoing activity; and, since the variety of alternative choices increases with the increasing complexity on higher levels, each upward shift is accompanied by the subjective experience of freedom of decision. ("We find [holons] in an ascending order of complexity") Holarchies possess interiority and consciousness
Holarchies possess interiority and consciousness	8.6 Consciousness appears as an emergent quality in phylogeny and ontogeny, which, from primitive beginnings, evolves towards more complex and precise states.

Table 1 shows the clear concordances between Koestler's OHS principles and Wilber's twenty tenets. I have pointed out these overlaps to show that Wilber's extended use of the holon construct clearly builds on Koestler's quite extensive and detailed explications of holon theory and that therefore the two models should be seen as a single continuum of development in the theory. Wilber has taken the foundational theorems laid down by Koestler and greatly extended their theoretical and practical application. As a whole holon theory needs to be seen as a new and very promising philosophy of knowledge that may well open up an entirely new and genuinely integrative understanding of the natural and social worlds and how they relate to each other.

There are several aspects of Koestler's theory that have, as yet, not been explored by Wilber or any other Integral theory writers. These include the concept of holonic exchange/input-output systems which looks at the way holonic outputs are triggered and how holons scanners and filter inputs. Koestler's concepts of "arborisation", "reticulation" and "regulation channels" also show promise as ways of seeing how holons can relate to each other. There is also the issue of holonic health and how holons change and Koestler's principles on holonic equilibrium, disorder and regeneration offer fertile ground for further study.

Holons and the Future

I noted earlier that Ken Wilber (2002b) has recently suggested some principles that define, what he calls, an Integral Methodological Pluralism (IMP). This idea refers to the broad characteristics of a discipline that can be considered to be an integral approach to a topic. Wilber maintains that any future over-arching model of knowledge will have possess the main principles that define an IMP. These principles are non-exclusion, enfoldment/unfoldment, and enactment. Wilber defines non-exclusion as follows:

Nonexclusion means that we can accept the valid truth claims (i.e. the truth claims that pass validity tests for their own paradigms in their own fields, whether in hermeneutics, spirituality, science, etc.) insofar as they make statements about the existence of their own enacted and disclosed phenomena, but not when they make statements about the existence of phenomena enacted by other paradigms. (2002b, 52)

This principle refers to the acceptance of partial but valid knowledge that has been gleaned by disciplines focusing on particular aspects of holons. Much of this knowledge has been the

result of reductionist paradigms (disciplinary matrices/methodologies). The second principle, enfoldment/ unfoldment is defined as:

nonexclusion often discloses an unfoldment that is enfoldment: in any particular developmental stream, successive waves transcend and include their predecessors, and thus each wave is adequate, each succeeding wave is more adequate. (2002b,73)

In short, in healthy unfolding, each wave is holistic, each succeeding wave is more holistic. (2002b, 81)

The unfoldment/enfoldment principle refers to the acceptance of the holistic and developmental nature of knowledge and methods. This principle relates to the idea that all knowledge bases and methods are connected and can illuminate each other. Wilber's third principle, the Enactment principle is explained as follows:

Putting all of these modes of inquiry together, as an enactment and disclosure of turquoise cognition, results in what we are calling integral methodological pluralism, which embodies the more practical side of an Integral Post-Metaphysics (Wilber 2002a, 64)

phenomena are enacted, brought forth, and disclosed by practices, then we realize that what appeared to be "conflicting phenomena" or experiences are simply different (and fully compatible) experiences brought forth by different practices. (2002b, 89)

So enactment refers to the novel capacity of an IMP to situate and provide a new integrative context for all other partial approaches be they reductionist or holistic. It is precisely these three IMP capacities that are made available when the holon is seen as the unit of analysis for Integral theory. This leads to what Wilber calls Integral indexing or conferencing.

"AQAL indexing" ("integral indexing" or "holonic conferencing" [see below]) allows individual paradigms to be seated next to each other at the integrative table, in such a way that each individual paradigm is honored and acknowledged. (2002b, 75)

Richard Slaughter, in an essay on the possibilities of an Integral Futures discipline, has pointed out that any futures studies practitioners will not only need to understand the potentials and limitations of their own worldviews but will also need to be "proficient in exploring other perspectives" and the relationships that come out of the meeting of different perspectives. There seems to be an imperative here for scholars who deal with Big Pictures to take on the IMP framework. As part of this move, I would further add that the holon construct and holon theory may well be an essential aspect of any IMP. I say this simply because the holon framework presents a methodological basis for the IMP principles. The holon construct allows for the discriminative analysis of phenomena through non-exclusion, it allows for the inclusion of holistic and developmental through unfoldment/unfoldment, and it allows for the active discovery of insight and connective knowledge through its capacity to generate the enactment of integrative practices. The holon is the core unitary construct that will define any IMP approach to investigating, experiencing and analysing the human encounter with our world.

Conclusions

The holon construct and its associated theory has the potential to play a crucial role in the movement to combine

and synthesise scientific and cultural knowledge about psychological and social realities.

While there is a long tradition of attempts to derive a comprehensive philosophy for understanding human realities it is only with the 19th and 20th centuries contributions of evolutionary theory and developmental models of human growth that this synthesising project has really come of age. In many ways holon theory is the culmination of this integrative movement and its development comes at a time when such connective knowledge and holistic approaches are most needed. The global systems that threaten the development of healthy and sustainable social development require systemic and integrative modes of imagination and action. Holon theory as an example of an IMP provides the scope and insight that global crises demand.

It is not by accident, I believe, that the two founders of holon theory have both come from outside of academia. One from the world of journalism and real politics and the other from the world of contemporary spirituality and the human potential movement. Out of their visionary thinking these two writers/philosophers have forged a new approach to seeing the breadth and depth of reality and the challenges that are inherent in it. Koestler and Wilber's lives and writings are very different but also in a deep way very complementary. One comes from the experience of war and revolution in continental Europe while the other comes from a secluded life of inner journeys. One writes fiction as a way of wrestling with the world of human suffering the other writes non-fiction as a way of mapping out the potential for life. One immerses himself in the psychologies and philosophies of the western tradition and the other follows contemplative paths of Eastern spirituality. Together they bring a new vision to how we and our realities are connected to each other. In the chapter which introduces the neologism "holon" for the first time, Koestler quotes the writer L.L. Whyte who said that, "fertile vistas may open out when commonplace facts are examined from a fresh point of view." In my view the holon, and its associated theoretical principles, will open up the richest and most crucial fields of scientific and cultural endeavour in the 21st century.

References

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