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SCIENCE-PHILOSOPHY OF SCIENCE

■ The Observer and the Observed

Paul Kieniewicz

■ QUANTUM NONLOCALITY AND REALITY – 50 YEARS OF BELL'S THEOREM

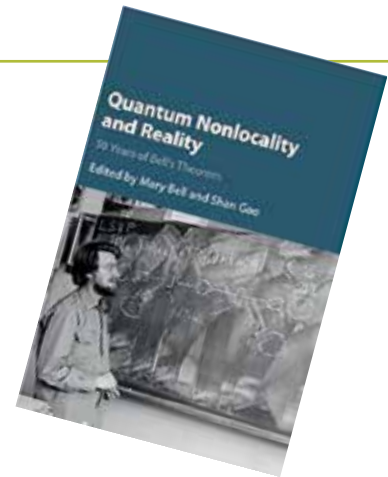
Edited by Mary Bell and Shan Gao

Cambridge University Press, 2016, 441 pp., £ 82.99 - ISBN 978-1107104341

Fifty years ago John Bell published a groundbreaking paper, in which he suggested that quantum physics is nonlocal. In this highly technical book, physicists present their views on Bell's Theorem and what is meant by nonlocality. Several alternative versions of quantum mechanics are also discussed, in particular that of David Bohm.

The implications of Bell's theorem and non-locality are a hot topic not only among physicists but in New Age circles. Many people talk about the "quantum mind", multiple realities, about the nature of consciousness in the same breath as Bell's Theorem. It is often said that quantum mechanics implies the existence of consciousness, or that consciousness can affect quantum processes. Another view is that that "we create our own reality". Our own universe. Unfortunately, most of those views are unwarranted extrapolations of Bell's Theorem. The Theorem is extremely subtle, and has been misunderstood even by specialists in the field. It has far reaching implications in areas that are only now starting to be explored.

In standard quantum physics, it is said that the observer's presence changes the result of an experiment, through wave-function collapse. That the observer is separate from the apparatus. This view lies at the heart of the Copenhagen Interpretation, still regarded as the foundation of quantum physics. A photon for example, is said to behave like a wave or a particle, depending on the experiment that is being performed. Whether or not it is being observed. The circumstances in which we find the photon are key to its nature. Einstein disagreed with this view, just as he also disagreed with the



statistical interpretation of the Schrodinger wave function which states that a particle does not have a well-defined path and momentum. Also, he could not accept the apparent separation of the observer and the experiment. Neither did John Bell, who felt that though the Copenhagen Interpretation gave the correct results, the theory lacked clarity. Whereas physicists generally adopt a view dubbed "For all practical purposes" (FAPP) that allows them to remain vague about what an electron is, Bell felt that we would gain additional results and insights if we understood the physics more clearly. Elementary particles are real objects. He called them beables. Beables are not depended on the observer. We know macroscopic beables such as an electric or magnetic field. What kind of beable is a quantum particle? Bell was convinced that we are dealing with a real entity and not a mathematical figment.

Early on in his career, Bell was drawn to the work of David Bohm. Bohm was also dissatisfied with the separation of the observer and the experiment. He viewed quantum behavior as deterministic and not random or statistical. In his paper, Sheldon Goldstein quotes Bell,

"But in 1952 I saw the impossible done... Bohm showed explicitly how parameters could indeed be introduced... with the help of which, the indeterministic description could be transformed into a deterministic one. More important, the subjectivity of the orthodox version, the necessary reference to the observer could be eliminated..."

Bohm's view was that the photon is simultaneously both a wave and a particle, a view also expressed by De Broglie. Its journey from point A to point B follows a definite trajectory, but one that is steered by its quantum potential. Quantum potential

is an extra non-local term Bohm introduced into the Schrodinger equation. It does not depend on space or time. Its presence is responsible for the odd trajectories of photons as they pass through two slits in the Young's interference experiment, resulting in the commonly observed interference pattern. In Bohmian mechanics the photon does pass through either one slit or the other, not (as per the Copenhagen interpretation) through both. In short, Bohmian mechanics is deterministic but nonlocal. Where is the observer? He is inseparable from the experiment. As Bohm's friend J. Krishnamurti expressed it, "the observer is the observed." This is the fundamental difference between Bohmian mechanics and the Copenhagen Interpretation. As Basil Hiley explains in his chapter, a particle does have a defined position and momentum. This does not violate the uncertainty principle, as that principle refers only to the limits on measuring the position and momentum.

This view has been long dismissed by most physicists because it was viewed (incorrectly) as implying the existence of hidden variables. Many physicists from Von Neumann to Bell himself have proved that such variables do not exist. However, the quantum potential as described by Bohm does not imply hidden variables. Today, experiments to measure Bohmian trajectories have been successfully performed that confirm the theory's predictions, as a result of which more physicists are taking another look at Bohm's mechanics.

Bohmian mechanics is also nonlocal --- allowing for "spooky action at a distance". It was this feature that Bell described in his theorem, also known as Bell's Inequalities. What is an inequality? $\frac{3}{4} > 1$ is an inequality. It is also an inequality violation because it is untrue. In his lucid chapter, quite readable by the non-specialist, Jean Bricmont describes Bell's Inequalities and why those lead to nonlocality.

Take two particles that are produced together with opposite spins in a magnetic field. According to quantum mechanics, if you measure the spin of particle A, you immediately know the spin of particle B, regardless of how far apart those particles are. Possible explanations are:

1. The spin values, up or down, of both particles are predetermined.
2. There is some form of instantaneous action between A and B regardless of their separation.

Bell proved that option (1) leads to an internal contradiction, assuming that the particles obey the rules of quantum mechanics. This implies that the particles do communicate instantly. Einstein found this even harder to believe. In a 1942 letter he wrote:

It seems hard to sneak a look at God's cards. But that he plays dice and uses "telepathic" methods (as the present quantum theory requires of him) is something I cannot believe for a moment.

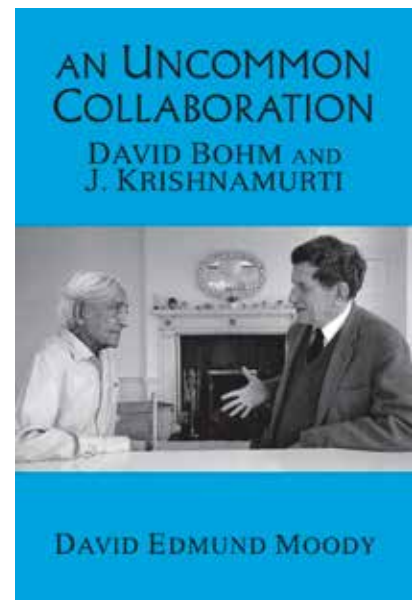
However, Bell's Inequalities were borne out by experiments in the 1970s and 80s by Freedman and Clauser, Aspect, Orsay and others. Marco Genovese summarises those results, implying that nonlocality is real.

If particles can communicate instantly over large distances, what is the mechanism? Standard physics offers no explanation. Bohmian mechanics offers a mechanism, because quantum potential, an integral part of the theory, is already nonlocal. But Bohmian mechanics is not the only explanation for apparent nonlocality. Lev Vaidman and Travis Norsen describe the Many Worlds Interpretation. If we accept that events happen simultaneously in many worlds, we can explain Bell's result, and still avoid an unexplained action at a distance. However, the mathematical details of the Many World Interpretation are yet to be worked out.

Is a nonlocal world incompatible with relativity? The answer is by no means trivial. Even though a message cannot be conveyed instantaneously using entangled particles, information is transmitted --- faster than the speed of light. By measuring one particle's spin, the second particle's spin is instantly established. That counts as cause and effect. Shan Gao explores describes nonlocality and its apparent incompatibility with relativity. Does nonlocality mean that at some fundamental level there exists a preferred Lorentz frame of reference, analogous to the aether? Is there a possibility for superluminal signaling? Gao points out that if a preferred frame of reference does exist, it should be detectable by experiment. The Cosmic Microwave Background could be such a frame. What if an entangled microscopic particle has conscious awareness? Conceivably that particle could manifest its awareness, of its spin, by an action detectable by a measuring device. This could make superluminal signaling possible. While Gao admits that his hypothesis is highly speculative, he suggests that nonlocality should cause us to rethink the possible existence of a preferred frame of reference. One has to ask whether Bohm's Implicate Order could be such a frame of reference.

This reviewer is left with the impression that there is no consensus on the implications of Bell's Theorem. Everyone accepts the results of the experiments, and most feel that nonlocality is real. But there is no agreement on what that means. More conservative voices feel that standard quantum mechanics can accommodate nonlocality. That nonlocality has no practical meaning except to philosophers. But many others express a certain queasiness, that perhaps the Copenhagen Interpretation is limited or plain wrong. David Bohm may have been right all along. Perhaps some predictions of relativity must be questioned. The far reaching implications of Bell's Theorem clearly remain yet to be seen.

Paul Kieniewicz is a geologist, astronomer and writer. He is the author of Gaia's Children, co-author with Andrew Glazewski of Harmony of the Universe.



■ **Intelligence and Insight**

David Lorimer

■ **AN UNCOMMON COLLABORATION**

David Edmund Moody

Alpha Centauri Press, 2017, 300 pp., \$24.99, p/b - ISBN 978-0-692-85427-3

The author is surely correct in describing the collaboration between Krishnamurti (1895-1986) and David Bohm (1917-1992) as uncommon, since, as he points out, most collaborations take place within the same discipline. There is no doubt that they were both men of genius, deeply concerned with the human situation, its limitations and prospects. It is useful to think of Krishnamurti as a psychological philosopher, or even as a philosopher of mind; David Bohm is as much a philosopher as a physicist, and he was someone with a subtle and probing mind always trying to reach the ground or root of an issue. In that sense, both men were radical thinkers.

Bohm learned of Krishnamurti's work through reading *The First and Last Freedom*, with a foreword by Aldous Huxley. He wrote to the publishers and the two men met in London, leading to a total of 144 recorded dialogues, some of which were published in two volumes, *The Ending of Time* and *The Future of Humanity*. David Moody is in a unique position to write this book, having worked closely with both men when he ran Krishnamurti's Oak Grove School - and he had scores of long walks with Bohm, where he was able to absorb as well as probe his ideas. The book gives useful biographical background of both men and their interactions, looking in more detail at central themes in their dialogues, with some useful appendices, three of which feature David's own dialogues with Bohm.

One of the concerns that brought the two men together was wholeness, incorporated in the title of Bohm's best-known book,

Wholeness and the Implicate Order (1980), which I read in 1983 after hearing Bohm speak at the Mystics and Scientists conference. Both men addressed thought and its fragmentation, of which more below. For Bohm, this was associated with the mechanistic and reductionist approach of science analysing things into discrete, separate units. This gave the wrong basis, which they both felt should be the ground or undivided wholeness, from which the explicate order of separation arises.

In his 1980 book, Bohm used as a point of departure undivided wholeness, which both relativity and quantum theory have in common. Undivided wholeness means dropping the primacy of the mechanistic order and seeking a deeper ground of reconciliation where 'both relativity and quantum theory are to be derived as abstractions, approximations and limiting cases.' (p. 173) Bohm speaks further about this elsewhere in the book, where he points out that, like Newton's theory, relativity is based on the idea of perfect continuity, while quantum theory violates continuity by definition. This makes one wonder whether the polarity of continuity and discontinuity can be resolved at a deeper level, as Bohm proposed. Even more interesting is the point at which theory breaks down, which Bohm feels is at the Planck length of 10^{-33} - this involves constants from relativity, gravitational theory and quantum theory. The structure of the electron has only been investigated down to 10^{-16} , so Bohm points out that there is a long way to go. He states that fluctuations in the gravitational field increase with shorter distances, so at 10^{-33} space and time become indeterminate. This sheds new light on scientific hypotheses as approximations by defining an absolute limit to theoretical validity.

The dialogues draw a distinction between intelligence and thought. Intelligence gives rise to insight, which, it is argued, is beyond the operation of thought. While thought is tied to time and the ego, insight 'is neither matter nor a material process; it is instantaneous, a flash of light, a form of pure perception.' (p. 124) Bohm adds that 'the operation of intelligence is the absence of movement of thought.' (p. 200) This leads to a more detailed consideration of the nature of thought, which runs through the volume. The thinker or observer introduces what both men felt was an artificial division in consciousness; they maintained that the thinker is the thought, the observer is the observed, and that the very existence of the thinker is created by thought. Some of the most interesting conversations explore the relationship between the ego, time, becoming and the ground. To live from the ground is to be undivided, while the ego living in time is trying to become something other than itself, a paradoxical aim. My only question in this respect was that Krishnamurti makes no space for the witness aspect of consciousness.

More generally, thought as a system - including feelings and the state of the body - is the source of our most intractable

problems. As Einstein also observed, problems cannot be resolved with the same kind of thinking that originated them, and it is interesting to wonder if he actually discussed this question with Bohm while they were together at Princeton. Krishnamurti expresses the view that our civilisation is highly cultivated but also barbarous, so the question becomes: can we in fact go beyond our conditioning? Bohm tried to do this with his practice of dialogue in which assumptions are consciously suspended as we try to reach a deeper understanding of other people. A greater awareness of the limited nature of thought and therefore of fixed positions would help enormously in addressing our pressing global challenges.

Appendix 4 is a fascinating dialogue on physics and the laws of nature, in which it becomes apparent that Bohm is very well informed in pre-Socratic philosophy, which is probably the origin of the search in physics for one basic underlying principle - for Thales this was water. More generally, Bohm sees physics as the systematic study of nature using reason, observation and experiment. He regards the essence of the universe as mathematical relationship and stresses that the essential principle of the physical world is contained in equations rather than verbal concepts. Theories are symbolic structures, interpretations that can be tested by experiments, the primary function of which is to answer questions raised in theories.

David Moody has rendered a huge service to studies of the Krishnamurti/Bohm dialogue, not only for his clear and sympathetic elucidation, but also for the way in which he engages readers in this same quest for understanding human consciousness - after all, we all have our own thought systems that require more rigorous self examination.

■ Aim-Oriented Empiricism

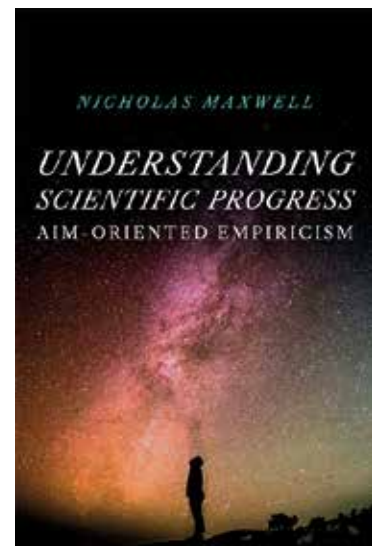
David Lorimer

■ UNDERSTANDING SCIENTIFIC PROGRESS

Nicholas Maxwell

Paragon House, 2017, 216 pp., \$24.95, p/b - ISBN 978-1-55778-924-2

Willis Harman, the first President of the Institute of Noetic Sciences who devoted the last few years of his life to exploring the metaphysical foundations of modern science, used to say that philosophy of science is to scientists what ornithology is to birds, a discipline that seems to have no relevance to practical working scientists. Since it was first formulated by David Hume, the problem of induction has been insoluble. Hence Nicholas Maxwell's statement that, despite the astonishing progress of natural science and improving our knowledge and understanding of the universe, philosophy seems to have made no progress at all in understanding how this progress of science as possible. He quotes CD Broad as saying that induction is the glory of science but the scandal of philosophy, and Whitehead that the theory of induction is the despair of philosophy - yet all our



activities are based upon it. By this he means standard empiricism, of which more below.

Maxwell - now 80 - has been contributing to the philosophy of science for 50 years, and nearly 50 of his articles are cited in the bibliography. His 1984 book, *From Knowledge to Wisdom* was favourably reviewed in *Nature*, and the reviewer, Christopher Longuet-Higgins, described his work as revolutionary in terms of our intellectual goals and methods of enquiry and that there were too many symptoms of malaise in our science-based society for Maxwell's diagnosis to be ignored. (p. 181) However, it does seem to have been ignored in the intervening period, which I think has a great deal to do with the massive resistance he refers to among scientists in acknowledging the necessity of underlying epistemological and metaphysical assumptions effectively denied by standard empiricism with its insistence that evidence alone determines what theories are accepted and rejected in science.

This technical but important book addresses these issues and provides a coherent solution. It is inevitable that science has to make metaphysical assumptions concerning the knowability and comprehensibility of the universe. This means that the claim that evidence alone determines the acceptance or rejection of new theories is false. Theories also have to be unified, simple and explanatory - hence disunified theories, however appealing empirically, are discounted. Induction and underdetermination mean that theories cannot in principle be verified by evidence, and in practice 'scientists invariably choose that theory which is the simplest, the most unified, or the most explanatory.' (p. 3) This means that we need a new conception of science that solves the philosophical problems of progress - and this is precisely what this book proposes in terms of 'aim oriented empiricism'.

Given that science must inevitably make metaphysical assumptions, the best and most rigorous scheme is what Maxwell calls

presuppositionism. By acknowledging that science makes a persistent metaphysical assumption concerning unity (eight criteria are articulated in great detail) it is by definition more rigorous than any standard empiricist conception that denies this. Moreover, it corresponds to the principle of intellectual integrity and making assumptions explicit so that they can be critically assessed. In a key chart on page 67, Maxwell adopts a hierarchical scheme whereby the most general metaphysical assumption is expressed at level 7 – that the universe is partially knowable – moving down through six levels including the notions that the universe is comprehensible in physical terms towards accepted fundamental physical theories and their relationship to empirical data.

An important point is that the blueprints describing the composition of reality are always changing, so that, historically, they turn out to be false and provisional. Ether was abandoned in favour of fields then quantum entities, culminating in the current standard model, which will in turn prove to be inadequate. Maxwell agrees with Popper that our knowledge is conjectural, but criticises his adherence to standard empiricism and his uncritical attitude towards criticism itself. He argues, correctly in my view, that his aim-oriented empiricism facilitates the critical assessment and improvement of metaphysical assumptions related to the improvement of knowledge.

One of the reasons for scientific resistance to acknowledging metaphysical assumptions is the reluctance to acknowledge that there is an element of faith in science. This becomes clear with dogmatic atheism and scientism, whose assumptions should also be subjected to sustained critical scrutiny. Maxwell is correct in saying that dogmatic religion does not have this self-critical element. Equally, he is aware of the limits of the physicalist approach in its implicit denial of qualia, meaning, value and free will. He asks how our human world imbued with the experiential, consciousness, free will, meaning and value can exist and best flourish, embedded as it is in the physical universe (p. 168). His answer is that physics describes only a highly selective aspect of existence: no physical statement can predict or describe experiential features, leading to the so-called hard problem of consciousness.

In the final chapter, Maxwell extends his analysis by formulating a corresponding aim-oriented rationality with a structured chart implying value and political or humanitarian assumptions on page 175. This addresses the aim of how to achieve a civilised, good world, about which people have very different ideas. Here, level 1 is human experience rather than empirical data, and the basic currency is actions or possible actions. We live in an era where science and technology have in fact brought about 'almost all our current grave global problems: rapid population growth, destruction of natural habitats and rapid extinction of species, the lethal character of

modern war, the development of extreme inequalities of wealth and power around the globe, pollution of earth, sea and air, and most serious of all, the impending disasters of climate change.' (p. 180) Science has enabled us to learn more about the nature of the universe, but we have a long way to go in learning how to become more civilised or 'wiser by increasingly cooperative rational means'. Maxwell has a great deal to offer with these important ideas, and deserves to be much more widely recognised than he is. Readers with a background in philosophy of science will appreciate the rigour and thoroughness of his argument, while more general readers will find his aim-oriented rationality a promising way forward in terms of a future sustainable and wise social order.

■ Bridging Conventional Science with a Holistic Science of the Spiritual

Dr Michael Evans

■ ANTHROPOSOPHY AND SCIENCE - AN INTRODUCTION

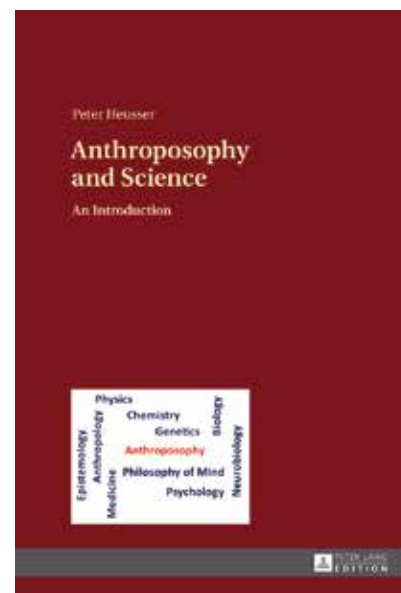
Peter Heusser

Peter Lang, 2016, 368 pp., £45, h/b – ISBN 978-3-631-67224-2

"Anthroposophy and Science" is a remarkable state-of-the-art milestone in exploring the relationship of natural science with spiritual science as originally represented by Rudolf Steiner (1861-1925). The book reflects the author's high standard of scholarship and reviews the latest concepts in physics, chemistry, biology, genetics, medicine, neurobiology, psychology, philosophy of mind or cognitive science, anthropology and epistemology, all in their relationship to anthroposophy. To write an up to date overview of one of these fields is a significant task, but to provide a comprehensive overview of them all is a magnificent achievement of a very high order.

The reductionist materialistic world view not only characterises conventional natural science, but our current whole world culture and understanding. To penetrate this thinking and really explore alternatives I found exciting and even disturbing! I became aware of how deep this reductionist science sits in my own consciousness, in spite of 50 years' study of anthroposophy.

The fundamental realisation expressed in Steiner's *Philosophy of Freedom* is that world reality meets us through the combination of sense perception and thought. A modern philosopher Nagel points to the realisation that the world is intelligible and includes human beings with intelligence. (Nagel, T. 2012 *Mind and Cosmos. Why the Materialist Neo-Darwinian Conception of Nature is Almost Certainly False. Oxford University Press, Oxford.*) So intelligence has a double part in existence. The realisation that the universe is lawful and potentially



understandable is implicit in ordinary science. So thought and the laws of nature are part of the natural world. Thought itself is not a physical object. Steiner equates thought, intelligence and spirit. In which case we can say that spirit is the foundation of the material world and every layer of existence including the phenomena of life, sentient beings (animals) as well as human beings who think about the world.

As the starting point of knowledge (epistemology) is thought and perception, theories of sensory physiology or neuroscience have no primary role in epistemology, as they are themselves the products of thinking and sense perception. Neither can atomic theory be assumed to be a primary reality, (based on non-perceptible atoms) which often used in science as a basis for rejecting the prime reality of perception.

A fundamental and recurring theme of the book is the way Peter Heusser considers the various levels of complexity in the world. He points out that with higher levels of complexity new characteristics and lawfulness emerge, which would not be predictable from the most complete knowledge of the characteristics of the constituent parts. Indeed, many of the characteristics of the parts disappear or are "sublated" in the more complex structure. The simplest physical and chemical example is water H₂O a combination of hydrogen and oxygen. Detailed knowledge of hydrogen and oxygen, he says, would never lead to a prediction of the characteristics of water and the laws of hydrodynamics. So the qualities of water cannot be reduced to the qualities of its component parts in spite of the fact that without hydrogen and oxygen water could not exist.

At a more complex level, proteins in living organisms although composed of a series of amino acids, have characteristics which cannot be extrapolated from knowledge of the amino acids and their sequence. For example, their tertiary structure which is

critical to their functioning as enzymes cannot be predicted from the amino acids and their sequence alone. So on the one hand, new properties emerge – the concept of *emergence* and on the other the properties of the components to a significant degree submerge or are *sublated* in the qualities of the new structure and its functioning.

Historically a Swiss Physician Troxler 1780-1866 (Beethoven's physician) observed that behind the sense perceptible phenomena of life was a real but not directly perceptible something, behind feelings a real not directly perceptible soul (Seele) and behind human self-conscious thought a real not directly perceptible spirit (Geist). *He attempted to sketch out a medical anthropology that would understand development, physiological functions and pathological processes as not simply physical interactions but as the expression of a harmonious or disharmonious interaction of material-physical, bodily-living, soul and spiritual forces in an organ or organ system.*

He went on to predict that in future a new sense was needed to develop, for the reality that stands behind life phenomena and the development of cognition of soul and spirit. He called such cognition anthroposophy as distinct from anthropology. A name with Steiner would subsequently use for his perceptions and researches. Troxler gave an opening address at the opening of the University of Berne where he became the first professor of philosophy. Biographically, I found it interesting that Peter Heusser shared one of the first chairs in Integrative Medicine with responsibility for the subject of Anthroposophic Medicine at this same University of Berne.

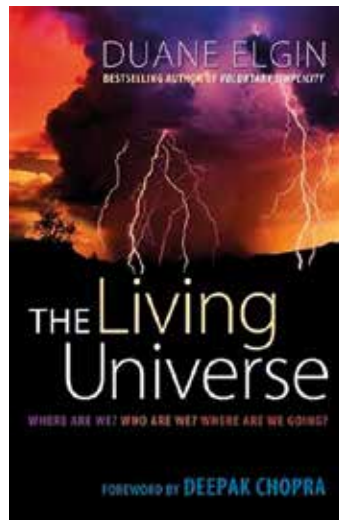
The fundamental perspective of anthroposophic medicine is based on asserting the reality alongside the physical material body (Körper), the living body (Lieb), the soul (Seele) and spirit (Geist). These emergent phenomena are described with reference to other western thinkers.

The work is referenced as expected of an academic paper and points to advances in natural science that make sense of many of Steiner's puzzling statements as well as the many way anthroposophy can holistically contextualise and make sense of the findings of natural science. It also provides a rational and philosophical framework that can integrate conventional and complementary approaches to medicine.

Reference

Nagel, T. 2012 *Mind and Cosmos. Why the Materialist Neo-Darwinian Conception of Nature is Almost Certainly False.* Oxford University Press, Oxford.

Dr Michael Evans is a retired NHS GP based in Stroud, Gloucestershire, now teaching doctors in the UK, the Philippines, Mainland China and Taiwan holistic and spiritual approaches to medicine inspired by Anthroposophy.



■ A Cosmic Connection

David Lorimer

■ THE LIVING UNIVERSE

Duane Elgin

Berrett-Koehler, 2009, 230 pp., \$15.95, p/b – ISBN 978-1-57675-969-1

Duane Elgin is author of *Voluntary Simplicity* and *Awakening Earth* – here he sets out his understanding of a living rather than a dead universe and its implications for how we see ourselves and our future. It is based on three fundamental questions: Where are we? Who are we? Where are we going? The Renaissance view incorporated the idea of an Anima Mundi and indigenous cultures assume an animistic universe, but since the 17th century the West has been dominated by the mechanistic metaphor implying a deanimated Nature and a fundamentally non-living and purposeless universe. Anthropomorphism is often criticised, but, as Rupert Sheldrake suggests, the modern scientific picture is in fact mechanomorphic - we project onto the universe our mechanistic understanding and explain ourselves in terms of this.

Duane defines a living universe as 'a unified and completely interdependent system that is continuously regenerated by the flow-through of phenomenal amounts of life energy whose essential nature includes consciousness or a self reflective capacity that enables systems at every scale of existence to exercise some freedom of choice.' (p. 12) He argues, correctly in my view, that how we see ourselves is a critical cultural factor and that the idea of the living universe will create a new sense of relationship with the Earth and the universe. He provides a very useful table on pp. 30-31 contrasting a dead with a living universe. In this view, consciousness is a living field of life energy providing reflective capacity, and we are fundamentally spiritual beings having a bodily experience. Ethically, because everything is alive and interconnected, 'whatever I do to the world I ultimately do to myself.' Duane then discusses the nature of the living universe in more detail, including the flow of energy, continuous regeneration and sentience throughout.

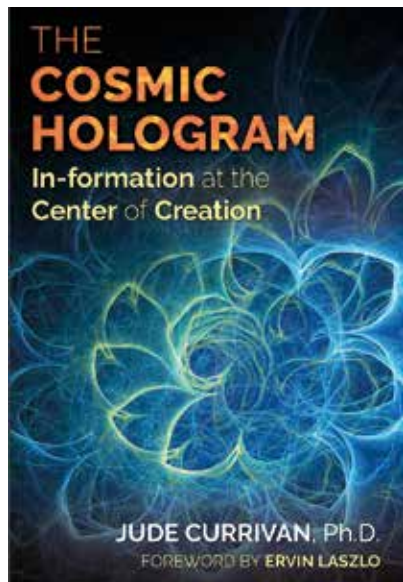
In the 1970s, Duane was involved in the government-sponsored SRI parapsychology programme, and this gave him the opportunity to explore his intuitive connection with some of the experimental apparatus. He calls this 'cosmic feedback training', implying an empathic connection with the universe and an extension of consciousness far beyond the range of physical senses. The effects are sometimes very subtle, and the fundamental relationship is not one of dominance, but rather participation. This gave him a felt sense that there is a field of consciousness pervading the universe, which is consistent with the definition of a living universe already cited.

The second part explores spiritual traditions and the idea that spirituality is intimacy with a living universe. He also looks at the idea of the Mother Universe as the ultimate beyond description, articulated variously as God, Brahman and Tao. He sees our identity as embodying three paradoxes: unity with diversity, knower and known, being and becoming. Consistent with insights from modern physics, his understanding of reality is one of vibrations, frequencies and harmonies, and the body is a biodegradable vehicle for acquiring soul-growth; when we leave the world, we take away 'the distilled knowing-essence of our passage to life' - I think this is spot on. He sums this up as follows: 'at the heart of life is a simple task: to become intimate and forgiving friends with ourselves and to grow ourselves as a stream of light, love, music and knowing. (p. 113)

The third part asks where we are going. At one level, life seeks to connect with itself, know itself and grow in an evolutionary process to higher levels of self-organisation. This also suggests the task in front of humanity, which Duane sees as a heroic journey from the limited thinking self through reflective and oceanic to what he calls flow consciousness characterised by the toroidal form as we awaken to a conscious living universe. He suggests a further collective scheme from separation to initiation to communion, similarly to Thomas Berry. The supreme test of our time is to 'learn to live in balance with the Earth, in peace with one another, and in gratitude to the living universe.' (p. 139) However, this involves dealing with what he calls 'adversity trends' as our ecological, economic, political, cultural, psychological and spiritual systems enter into a crisis of adaptation, quite possibly bringing about a world scale systems crisis, which we are already beginning to see, as it becomes increasingly clear that our current systems are radically inadequate.

The last part sets out a blueprint for action in terms of co-creating our story of awakening, cultivating reflection and reconciliation, living simply and sustainably, creating new kinds of community, and becoming media conscious citizens of the Earth. The current breakdown is an opportunity for breakthrough, but this is by no means guaranteed as we can either 'pull together in creative cooperation or pull apart in profound conflict', only to have a totalitarian order imposed from above

and maintained by violence and force. As I was reading this book, it occurred to me that many of the vital words in this respect begin with r: rebirth, renewal, renaissance, regeneration, restoration, reconnection, reconciliation, reciprocity and refinement. The value of this book lies in its setting out the necessary transformative vision for a positive future, but also in spelling out exactly how we can help bring this about.



■ **The Perfect Recipe**

Gunnel Minett

■ **THE COSMIC HOLOGRAM: IN-FORMATION AT THE CENTER OF CREATION,**

Jude Currivan, Ph.D. (SMN) Foreword by Ervin Laszlo (Hon SMN)

Inner Traditions, 2017, 256 pp., £12.99, p/b -, ISBN 978-1620556603, 272 pages, £12.99.

Jude Currivan, Ph.D., is a cosmologist, futurist, and planetary healer with a master's degree in physics from Oxford University and a doctorate in archaeology from the University of Reading. In this book, Jude Currivan set out to answer not only the question of how the universe came into existence but also why.

The book examines recent research to show how our Universe is 'in-formed' and holographically manifested. Currivan uses the metaphor of a recipe in which every part plays its role. It is not just a question of having the correct ingredients. It is also important how they are put together and the container in which they are mixed, etc... to achieve the perfect result. She writes: "Information..., literally in-forms all that we call physical reality, and from the innate instructions, conditions, ingredients, recipe, and container of the in-formation that make up the cosmic hologram, enables the outcome of a Universe that nurtures the evolution of complexity and ever more self-aware consciousness - makes a Universe that is perfect for us." (p. 112)

With numerous examples, Currivan illustrates how the universe came into existence. In particular, she emphasises the importance of in-formation. She concludes: "Our Universe appears to have come into being perfectly balanced, yet inherently unstable." (p. 119)

According to Currivan, this means that the fundamental nature of reality is based on the unity of consciousness in the universe. We are, in effect, co-creators of the universe rather than mere inhabitants of it. She supports this insight by reporting experiences of cosmic awareness. She compares this with the Eastern concept of maya. This claims that the physical world is, in reality, 'illusory', i.e. that what we perceive as real is in fact our perception of it being real. She explains that we have "...arrived at the perspective that we're each individuated microcosms of the holographic intelligence of our Universe and ultimately of the infinite and eternal mind of the Cosmos." (p. 215)

She also claims that we are at an historic turning-point from which, on the one hand, we may face the man-made destruction of our planet, or, on the other, we may be able to use our understanding of how and why the Universe was formed to create a better future for all of us. She points to ancient wisdom as a good guide to help us find the right way forward. This will require an open attitude to studying and learning from anecdotal evidence of non-ordinary events and realities.

Gunnel Minett is author of *Breath and Spirit*.

MEDICINE-HEALTH

■ **A Light Shining in Darkness**

Larry Culliford

■ **SADNESS, DEPRESSION, AND THE DARK NIGHT OF THE SOUL: TRANSCENDING THE MEDICALISATION OF SADNESS**

Glòria Durà-Vilà

Foreword by Professor Roland Littlewood

Jessica Kingsley Publishers 2017, 358 pp., £24.99, p/b - ISBN: 978-1-7859205-61

As a trainee psychiatrist in South Australia, forty years ago, I was sent to work in one of the 'back wards' for women in a large state mental hospital. On arrival, the nurses asked me to see an elderly Irish Catholic woman; as a favour, it seemed, because her mental health was stable. The two of us sat together in a small, darkened interview room for twenty minutes or so. I found the experience peaceful. All I had to do really was listen, and occasionally to encourage flow in the ensuing, essentially one-sided, conversation. The river of words – of which, regrettably, I now remember not one – eventually slowed to a trickle and then dried altogether, at which point we rose simultaneously and left the room. The final heartfelt words I heard as we parted were

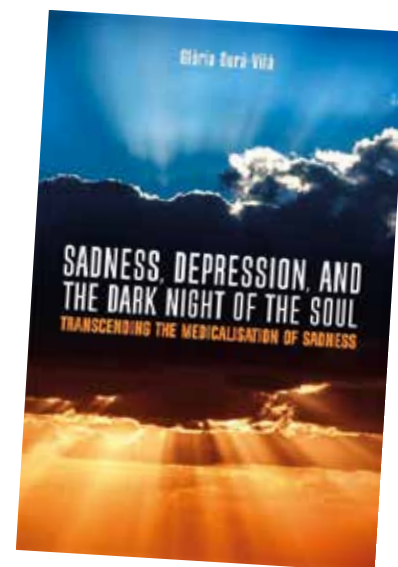
these, 'Thank you, Father'. This child of God had very likely used me to make her final confession, for she died a little while after.

The nurses indulged the Irishwoman's religiosity as harmless, but I could see how a routine of prayer and worship, however low key, might offer an effective antidote to the encroaching melancholy of old age after a barren, restricted and potentially meaningless life. This poignant episode was one of a number of encounters with patients – both medical and psychiatric (for I had earlier been a GP for two years) – persuading me of the importance for clinicians of taking full account of the spiritual dimension of people's lives. Thinking and later writing about this, discussing it with colleagues (doctors, psychologists, nurses, social workers, hospital chaplains and other clergy of my acquaintance), also with a Buddhist monk I encountered at the time, served only to convince me further.

In the late 1990s, groups of similarly minded professionals, meeting each other at SMN conferences, joined to initiate the 'Spirituality and Psychiatry' Special Interest Group (SIG) of the Royal College of Psychiatrists, and the 'Transpersonal Section' of the British Association of Psychologists.¹ These developments led eventually to publications and policy statements, but still attempts to publish articles on spirituality as relevant to psychology and psychiatry were being rejected by journal editors, who frequently asked the impatient rhetorical killer question, 'Where is your evidence for these assertions?' It would have been wonderful to have Glòria Durà-Vilà's excellent book to hand then.

'Sadness, Depression, and the Dark

¹ Those particularly involved included SMN members Andrew Powell, the late David Fontana, Sarah Egger, Peter Fenwick and Julian Candy.



Night of the Soul: transcending the medicalisation of sadness is an account of a detailed, extensive and informative piece of qualitative research conducted by the author, a bi-lingual Spaniard, living and working as a practising psychiatrist in London. It reports a study designed to explore the conceptualisation of 'deep sadness and consequent help-seeking behaviour', through analysis of data gathered from interviews with 57 practising Catholics in different parts of Spain.

Four groups of people on different religious pathways were involved: contemplative monks, contemplative nuns, lay theological students, and Roman Catholic priests. 'Carrying out this research was a wonderful and exciting experience for me', the author writes impressively. Her enthusiasm for the task, and for even-handedly discussing her findings, shines through on every page. This book was a genuine pleasure to read, the bonus being that many of my own thoughts and experiences over long years seemed substantially verified within its pages.

At the heart of Durà-Vilà's thesis is the idea of two types of 'deep sadness' – one pathological, one salutary – that sometimes overlap. One is a mental illness, not a reaction to identifiable challenges or loss. It is characterised by hopelessness, risk of self-harm, and requiring psychiatric intervention and physical treatment. The other reflects the notion of a spiritual aspect to human suffering, and the understanding that times of intense sadness often represent a normal and valuable aspect of spiritual growth, a condition (usually temporary) sometimes referred to as 'The Dark Night of the Soul', during which the subject remains 'hopeful in the middle of hopelessness' and is not at risk of self-harm.

A corollary of this dichotomy, also sensitively explored here, is a divergence of views and allegiances. On one side, there is an essentially worldly and commercial, science-based, pharmaco-medical community, ignorant and intolerant of the ways and wisdom of religious people. On the other is a more spiritually orientated, faith-based congregation, wary of secular formulations and pharmaceutical remedies for 'meaningful sorrow', the leaders of which admit lack of training on matters pertaining to psychiatry and mental illness. Those in each camp, the author concludes, would do well to examine their own weaknesses, with the aim of improving the service they offer people in distress, rather than entrench themselves in fixed positions and blame the others.

The fixed position of psychiatry, Durà-Vilà tells us, depends on a diagnostic classification system, 'deeply embedded in all aspects of psychiatric research and practice', that fails to tease out normal from pathological forms of sadness. This system is unlikely to change, she regretfully predicts, but adds more

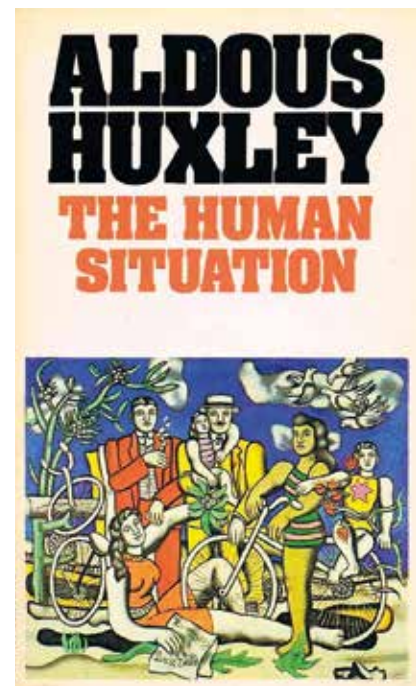
hopefully that conscientious doctors and other professionals who give sufficient consideration during assessments to the personal, social, cultural and spiritual dimension of patients' lives, rather than applying an inflexible, 'tick-box' medical model for diagnosis and treatment, overcoming constraints of time and resources where necessary, will contribute to progress and general enlightenment by setting examples of 'good practice' for others to follow.

The book is divided into three parts: 'Setting the literary and historical contexts' (chapters 1-3); 'Unfolding the narratives of sadness and spiritual growth' (chapters 4-7); 'Stepping beyond the monasteries and the parishes' walls' (chapters 8-11). Chapter 10, 'The clergy's role in assisting those suffering from sadness and depression', offers a warning that, as well as ignorance about psychiatric matters, 'Neglect of their own spiritual development' often prevented clergy from providing optimum spiritual support for those in need of it'. The final chapter, 'A framework to differentiate normal sadness from depression', intelligently encapsulates and develops the author's research and its constituent themes, offering relatively simple, useful, and indeed meaningful, guidance to clinicians seeking to help those who are deeply sad, clinically depressed, or experiencing something of both conditions.

I found the book is worth reading particularly for Durà-Vilà's evocative description of her subjects and their ways of life, and for the revealing testimonies concerning their own 'Dark Nights' of the religious people interviewed, especially the contemplatives. It is worth noting her point that, 'In the Dark Night, the suffering is not over the loss of God but rather the loss of prior notions of God' (p45).

To be divested of false or incomplete notions (whether of God or anything else), obviously serves to promote personal, intellectual and perhaps spiritual maturity, however painful the process. Durà-Vilà has done her readers a great service in exploring and lucidly explaining the subtleties of the debate, showing clearly the opportunities for growth and new wisdom involved in looking at problem areas like this 'from both sides'. I have no hesitation in recommending this thought-provoking and encouraging book to as wide a readership as possible: mental health professionals adrift of religion and spirituality; religious people adrift of psychiatry and mental health issues; plus anyone concerned with human suffering, with how to manage one's own emotional pain, and how to help others in similar distress. Such essential questions are at stake.

Larry Culliford is a retired psychiatrist and author of several books on spirituality, including 'Love, Healing & Happiness', 'The Psychology of Spirituality' and 'Much Ado about Something'. For details, see Larry's website: www.ldc52.co.uk.



PHILOSOPHY- SPIRITUALITY

■ Realistic Idealism

David Lorimer

■ THE HUMAN SITUATION

Aldous Huxley

Chatto & Windus, 1978, 261 pp., £4.95, h/b – ISBN 0-7011-2143-2

Aldous Huxley (1894-1963), brother of Sir Julian Huxley and grandson of TH Huxley, was one of the most brilliant intellectuals of his generation and author of some 40 books, including the classic books *The Perennial Philosophy*, *Brave New World* and *Island*. I first read this book in October 1978, so nearly 40 years ago, and it consists of a series of 16 lectures given at the University of California, Santa Barbara in 1959. Given that two of the books above depict his dystopia and utopia, I thought it would be interesting to reread the book, and I was not disappointed. It is said that one could infer from the topics of Huxley's conversation which volume of the Encyclopaedia Britannica he had recently been reading. In the first lecture, he apologises for being someone of 'encyclopedic ignorance', by which he really means that he is a generalist who is able to make unusual connections between different disciplines.

His first plea is for an integrated education, which he thinks should be based on fundamental human problems considered from a number of different angles. This would enable people to build bridges, as he himself does in these lectures as a man of letters. He feels it important to bring together the three worlds of abstractions and concepts, immediate experience and objective observation, and the world of spiritual insight. He returns to this theme in the final lecture where he recommends a training of

the mind-body in perception, in imagination, and in the use of language.

In this first lecture, he refers to the growth of technology and the 'technicisation of every aspect of human life'. In a lecture on the future he thinks that the most important mechanical advances will be connected with computers, mentioning an early version of a device for searching back numbers of scientific periodicals – something now routine. It would have been difficult for him to anticipate the Internet, but he does refer to Werner von Braun forecasting that satellites may be connected together into a kind of electric relay 'which will permit TV programmes to be globally transmitted at any moment' (p. 107) - not a prospect that he relishes. He is concerned, though, that such technological progress might strengthen the hand of the powerful minority against the majority. This is the case for instance in surveillance technology although the Internet is also a powerful driver of freedom and democracy.

His discussion of the environment has proved prescient. At the time of the lectures, the world population was 2.8 billion, and he devotes two lectures to the planet and the population explosion, forecasting that population will double in less than 50 years – it has now in fact tripled in just under 60 years since the lectures. He anticipates an increasing proportion of people living in cities, which he is concerned will leave them devoid of contact with the natural environment. So far as the planet as a whole is concerned, he remarks that humans have been increasingly 'a profound geological force' - indeed, since 2000, we now refer to the Anthropocene era. He likens us to parasites, and not very sensible ones at that, as we seem intent on destroying our own habitat. He catalogues the disappearance of species, the erosion of topsoil, the felling of forests and overgrazing - remarking that 'it is quite fantastic what the goat has succeeded in destroying; it includes the whole Mediterranean basin.' (p. 25) He concludes that 'the combination of human destructiveness and population increase is an enormous and frightening fact.' This is still true.

Huxley shows extensive knowledge of contemporary psychology, and notes the significance of Abraham Maslow and Fritz Perls, along with the implications of the teaching of FM Alexander for posture. In a lecture on the unconscious, he argues that the work of FWH Myers is much more illuminating than that of Freud. However, I found his most interesting observations related to the different temperaments represented by the body types of endomorph, mesomorph and ectomorph. He quotes the work of WH Sheldon and is critical of the classification in Jung's work on psychological types independently of the type of the body: the extrovert mesomorph is very different from his endomorph counterpart. It seems that this aspect is still largely neglected in modern psychology.

A number of lectures are devoted to political and religious themes, where Huxley's interesting starting point is a discussion of language: 'it is on the one hand the mother of science and philosophy, and on the other hand it begets every kind of superstition, prejudice and madness. It helps us and it

destroys us; it makes civilisation possible, and it also produces those frightful conflicts which wreck civilisation.' (p. 171) He observes that totalitarian regimes regard things and people as illustrations of key words – usually prejudicial. The same applies to war propaganda persuading people that those on the other side 'are the concretisation of very bad abstractions.'

This same issue is found in the history of symbol-manipulating religion, which he analyses in terms of myth, creed, and theology. This leads him to contrast the religion of direct acquaintance with the divine with the religion of belief systems. He is extensively acquainted with the history of mysticism and its often heretical status within orthodox circles. As we know only too well, religion as a system of beliefs has always been an ambivalent force, and Huxley notes that the strife-producing quality of religion as a system of theological symbols has not only brought about jihads and crusades, but internal friction and hatred within religions. He would be sad but not surprised to see the spread of terrorism, fundamentalism and fanaticism. Interestingly, he wonders why many otherwise open-minded scientific people refuse even to consider the evidence amassed by parapsychology, for instance by JB Rhine. He answers that the facts 'just don't make sense in terms of the worldview which we accept as more or less axiomatic.' This is still true today.

He sees much more promise in the mystical approach cultivating a sense of unity and solidarity with the world, as well as love and compassion. He quotes Eckhart's remark that what is taken in by contemplation is given out in love. He continues this discussion in the lecture on the natural history of visions, which he starts with the question: why are precious stones precious? His answer is that they remind us of transcendent visions, which he had some experience through mescaline in the 1950s, which he wrote up in a book called *The Doors of Perception*. He writes that the highest common factor in the visionary experience is that of subjective light – 'an immense white light of extraordinary power.' (p. 227) He would have been very interested in the advances made in the study of spiritual experience and near death experiences, where this light is frequently mentioned.

Huxley is sanguine about human political prospects. In a lecture on war and nationalism he comes back to the role of language and a conceptual system, remarking that 'war is conditioned by human symbol systems, and in our modern life symbol system is that of nationalism' - this is still largely true. He laments the extraordinary and paradoxical spectacle of unprecedented skill and knowledge being poured into projects leading to misery, servitude and death. He puts the point poignantly that preparations for war have always led to war and, given the role of armaments in the US economy, 'preparation for death has become the basis of Western prosperity'. (p. 82) He quotes a book he wrote in 1946 called *Science, Liberty and Peace* where he argues for the necessity of shifting the whole attention of politics from the unsolvable problems of power to the solvable and even more urgent problems of

human needs. Alas, we are still waiting, while the production of armaments and the pursuit of power are given priority.

This still leaves an important role for what Huxley calls realistic idealism or idealistic realism rather than a utopian idealism devoid of practical suggestions. Writing in 1958, President Sukarno issued an impassioned plea to draw back from the edge of moral bankruptcy and use science for peaceful purposes (p. 88). For Huxley, this means bringing together love and knowledge: 'love without knowledge is largely impotent, and knowledge without love is frequently inhuman. In the world as we see it today there is obviously a great deal of loveless knowledge and knowledgeless love - not to mention a good deal of both knowledgeless and unfortunately very knowledgeable hate floating around.' (p. 249)

He places his hope not only in education but also in cleansing the doors of perception: 'if we habitually saw the world as infinite and holy, we should obviously find it a great deal less necessary to go in for bullfighting, attacking minorities or working up frenzies against foreign peoples.' He continues: 'let us hope that sooner or later we shall find some method by which, combining awareness with trainings in good feeling, we may increase the sum of human decency and make the realisation of many of our latent potentialities possible.' (p. 253) This is a profoundly humanitarian vision that we can all share. Huxley was a great visionary with a deep understanding of human nature, and these lectures represent the culmination of 50 years of thought. When asked what advice he would give people, he replied that it was a little embarrassing after so much study that the best advice he could give was that people should be kinder to each other. Typically, this is both wise and humane.

■ Vision in Action

David Lorimer

■ LIGHT UPON THE PATH

Paul Fletcher

Chalice Well Press, 2015, £10.99, p/b – ISBN 978-1-906810-08-5

As President of Wrekin Trust, founded by Sir George Trevelyan in 1971, I attended a closing celebration of its work at Hawkwood College last month. There I met Paul Fletcher of the Chalice Well Trust and he kindly gave me a copy of this book of unpublished writings of Wellesley Tudor Pole. Much of the book is based on correspondence with Sir David Russell, who was a great benefactor of my own university at St Andrews, but about whom I knew nothing except his connection with a successful local paper mill. Tudor Pole and Russell corresponded a period of decades, and the archive is lodged in the University. This involved a huge labour of love on Paul's part, mirroring the prodigious output of WTP himself, writing up to 200 letters a day (and we think we are swamped by emails!). I felt a personal connection here, as Sir George was a spiritual mentor for myself, and had been in his turn mentored by WTP. Then also a connection with Russell who, towards the end of his life, wrote that 'what we are

here for is the development of what one might call Mind, which includes sympathetic understanding, imaginative purposes and all these qualities include and mean.' (p. 249)

WTP – as he was called - lived from 1884 to 1968, and was a mystic and visionary in action, who influenced many leading spiritual figures of the day, and is perhaps best known as the originator of the Silent Minute during World War II. The book draws on his unpublished writings in a chronological sequence and contains many gems of spiritual advice. Even as a young man, he writes about the critical factors of will, concentration and control and the importance of concentrating attention on the thought of oneself as the I am based on the reality of the one Self and Spirit - offering oneself in service to the whole. His experience during the First World War was decisive, and resulted in his book *Private Douding*, a post-mortem account of a soldier taken down as heard, although WTP recognises that he cannot even prove the reality of his source to himself. In any event, he transcribed the following inspiring words: 'if you will dwell in peace, learn to love deeply. Never cease loving. Love God by pouring yourself away. Love your fellows by giving them all you possess of light and truth. Love LOVE for her own blessed sake. Such love will bring you nearer heaven.' (p. 37) This also illustrates how WTP served as a bridge between the worlds while he emphasises the critical importance of spiritual work during our human lifetime.

One chapter is devoted to the discovery and significance of what came to be known as the sapphire blue bowl - representing the Grail cup - in 1906. The importance of this for WTP is that the cup of communion and fellowship should have been the central symbol of Christianity rather than cross. For him, the Sign of the Cross represents duality and sorrow, while the Sign of the Cup stands for unity and joy while also representing the feminine. The idea of companionship and fellowship is expressed in the Chalice Well Trust which he founded and which continues to this day. WTP thought that Glastonbury, Iona and an unspecified other location in the Western Isles were the key spiritual power points of the British Isles and formed part of a new energetic dispensation of the Light, embodying spiritual renewal in Britain. This vision was very much shared by Sir George and I remember getting a sense of it when sitting with him on Glastonbury Tor during Harmonic Convergence in 1987.

As I mentioned earlier, WTP is best known for his role in the Big Ben Silent Minute during World War II. This is an expression of what he called the Inner or Spiritual Front, and was inspired by a conversation in December 1917 when another officer received the message that, although he himself would not survive, WTP would live to witness an even greater and more vital conflict. Here, this officer and others like him could form part of an unseen army by using a special time of silence 'to give us our opportunity', observing that the power of Silence is greater than you know and

can form a channel between the visible and invisible worlds. For WTP, silence can become the gateway to the eternal Mind. He put in an immense amount of work in setting this up, including some 10,000 communications and 1,000 interviews, bringing the BBC, the King and Churchill on board. Eventually, millions of people were taking part. Later, in a letter to President Eisenhower, he reports that a staff officer of the German Intelligence Corps told him that during the war 'you had a secret weapon for which we could find no countermeasure and which we did not understand, but it was very powerful. It was associated with the striking of Big Ben at 9 PM each evening. I believe you called it the Silent Minute.'

WTP developed a further iteration of this impulse with the Lamplighter Movement along with Sir George Trevelyan (p. 290) and invoking the power of the Archangel Michael. I believe such an impulse is necessary in our own time, so as to harness the healing power of positive intent, and to this end I am working with the One Spirit Alliance on a parallel Heart of Light idea, also using the 9 PM silent minute in your own time zone - interested readers can email me for details. I will end this review with some words written to Rosamond Lehmann, whom I met through the College of Psychic Studies in the 1980s. WTP remarks that wisdom is not made up of a mess of theories, speculations and metaphysical intricacies. Many earnest pilgrims and students of the path of knowledge find themselves swamped and lost in by-ways leading to cul-de-sacs: 'the spiritual road to progress is a simple one and is not cluttered up by masses of non-essentials.' There is much rich spiritual nourishment in this book, which gives an intimate glimpse into the life, work and world of a remarkable spiritual visionary in action.

■ A Conscious Servant

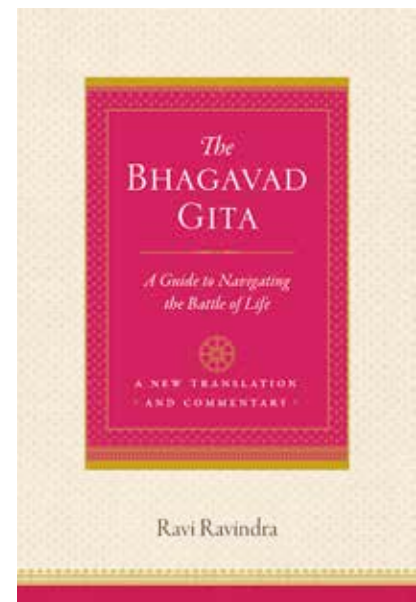
David Lorimer

■ THE BHAGAVAD GITA

Ravi Ravindra (SMN)

Shambhala, 2017, 302 pp., \$19.95, p/b – ISBN 978-1-61180-410-2

The Bhagavad Gita, according to Ravi, is perhaps the single most important text to emerge from India. I have a number of editions, including those by Juan Mascaro and Radhakrishnan, and this is a hugely valuable addition to scholarship around the Gita. At the recent Mystics and Scientists conference, Ravi remarked how rare it was for people to be both scholars and seekers, which he is. Having been a professor of physics, philosophy and comparative religion, he has now intensified his work as a seeker, although both the scholar and the seeker are represented in this text. Ravi first became aware of the Gita when he was 11 and was struck when his father read out the 19th verse of the seventh chapter: 'At the end of many births, a wise person comes to Me, realising that all there is is Krishna. Such a person is a great soul and very rare.' His father said to him that he could tell him these words but did not really know what they meant, and wished



for him to find a teacher or teaching so that he could understand its real meaning. This has surely shaped his quest.

In 7:3 we read: 'Among thousands of human beings scarcely one strives for perfection, and among those who strive and attain perfection, scarcely one knows Me in the full truth of My being.' This is a reminder that most of us spend our lives on the horizontal, material dimension without establishing a real vertical connection with the spiritual level. We may do so for a while, but are subject to many distractions as the monkey mind leaps between the branches. This tension typifies the central metaphor of the Gita, namely struggle and battle between the higher and lower within ourselves. One of Ravi's teachers was Jeanne de Salzmann, about whom he wrote in his book *Heart without Measure*, and who is extensively quoted here. She spoke a great deal about the higher or finer energy and the role of the human being and the body in channelling this as a contribution to evolution. In this respect, the question what do I serve is a critical one. As Ravi observes, we are capable of transcending self-will and becoming an instrument of Krishna or Christ. Salzmann remarks that energy cannot be without relationship: 'if it does not serve I intentionally, then it automatically serves the ego.... Unless there is the I, there is only the ego. One recognises the presence of I from the fact that I wishes to serve.' (p. 109) Elsewhere, she is quoted as saying that we can either be an unconscious slave or a conscious servant.

In the West, there is much talk of freedom, but for Ravi the most important freedom is not for the self but from the self, which is *vairagya*. We each have our *svadharma* or responsibility in accordance with our *svabhava*, or essential nature or inner calling. In this sense, we can all make our own contribution to order in the widest sense, both through mindful attention characterised by yoga and through right action. Here we come to one of the fundamental teachings of the Gita, action without attachment to the fruits of action. Taken one stage further,

this becomes sacrificial action, and Ravi characterises sacrifice as central to the spiritual life of transformation. In this process, we can move from unconscious reaction to conscious response.

One of the hallmarks of Ravi's translation and commentary is the width of his erudition. He quotes liberally and extensively from East and West as well as from sages like Plotinus and the Cloud of Unknowing. He sees self-transformation as the sole purpose of all spiritual disciplines, and remarks that all spiritual teachings in India, unlike the biblical ones, are insight oriented, in other words involving *jnana* or what we in the West would call *gnosis*. It is significant that the Gnostic Gospels have made a comeback as this element was largely excluded from the canonical texts. I think he is right in saying that Krishna, as opposed to Christ, is primarily a teacher rather than saviour, although this is also the view of Gnostics, who spend time on opening the eyes of the spirit.

Beyond gnosis, though, is perhaps the state of unknowing referred to by Ravi: 'an open mind is passionately searching and always unknowing.... True religious mind is silent, free of fear and self-importance, innocent, open, and vulnerable, full of wisdom but unknowing, willing and able to be surprised.' (p. 122) As the mystery deepens, 'it is known but there is no one who knows it.' Ravi distinguishes scientific from spiritual mysteries, which he regards as unsolvable: 'they call for a radical transformation of our whole being, including the mind, so that we may come to a different level of the mind.' (p. 204) Here, the mystery can be lived and dissolved as action, knowledge, meditation and love support each other in an ever finer and finer quality of being of the searcher (p. 251).

In response to the verse cited by Ravi's father, the Yogi sees the Self and everyone and everyone in the Self (6:29). Thus they can become impartial, beyond attachments to knowledge, action and indolence, corresponding to the three gunas of *sattva*, *rajas* and *tamas*, extensively discussed in this edition. This translation and commentary is the result of over 60 years of reflection and practice and is essential reading for both scholars and seekers since the central elements of the spiritual life are universal in all times and all places. We are all engaged in a struggle at some level, but it is our responsibility to choose that level consciously and work on refining our being and actions. The French writer Buffon once said that 'le style, c'est l'homme même' - a person's style expresses their essence, and in this respect I was struck by the Hasidic story about a man who was asked whether he visited his master to hear his words of wisdom. "No", he replied, "I want to see how he ties his shoelaces." Everything we do manifests our being, but the question is how consciously we act. Studying this book can enhance and refine our capacities to help make us more conscious servants.

PSYCHOLOGY-CONSCIOUSNESS STUDIES

■ A Postmaterialist Psychology

David Lorimer

■ THE OXFORD HANDBOOK OF PSYCHOLOGY AND SPIRITUALITY

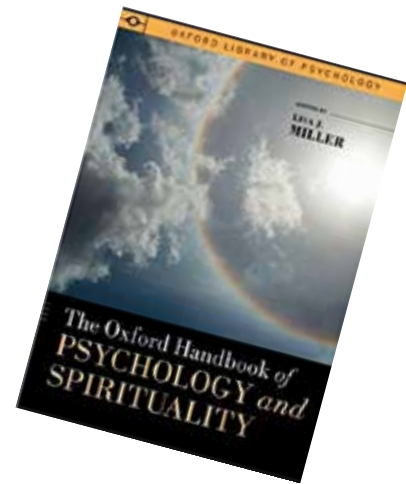
Edited by Lisa J. Miller

Oxford, 2012, 634 pp., £52, p/b – ISBN 978-0-19-935734-5

This is a landmark volume, especially given the fact that it has been published by one of the world's leading university presses. It forms part of the Oxford Library of Psychology, a series designed to review major sub-disciplines with breadth, comprehensiveness and exemplary scholarship; it also combines a searchable online facility. Significantly, though, only two of over 60 contributors from outside the United States.

In her introduction, Lisa Miller remarks that the handbook is at the cutting edge of an expanded psychology that directly addresses the broadened set of ontological assumptions and a view that spirituality is fundamental to the human constitution. In one sense, it continues the work of William James after a long diversion by taking the human mind as part and parcel of a living spiritual reality, which leads to an expansion of psychology 'by a Copernican magnitude' in the direction of postmaterialism, 'a science beyond the limitations of exclusive ontological materialism and mechanism.' This takes consciousness as fundamental and the fabric of reality.

Miller argues that postmaterialist spiritual psychology can live alongside work conducted from a materialist perspective, adding that 'materialist science merely needs to make its assumptions clearer as it sustains a vital place abreast work conducted from other ontological contexts'. The word 'merely', though, is a big ask, even if the limitations of materialism are becoming more evident, at least to authors in this volume. Significantly, the author organised a student lecture for some of the contributors at Columbia University Teachers College and when they entered the largest available theatre, they found it full to overflowing. Later, students remarked that 'this is the [postmaterialist] education that we want; the old scientific models feel dead to us... I already assume a spiritual reality, most of us do, so now what? We want to learn from this perspective.' (p. 3) Miller concludes that the science in this handbook 'shows our universe to be alive, guiding and so very sacred. The scientific perspective that all consciousness is one and sacred may reawaken our appreciation of living beings around us, all life.'



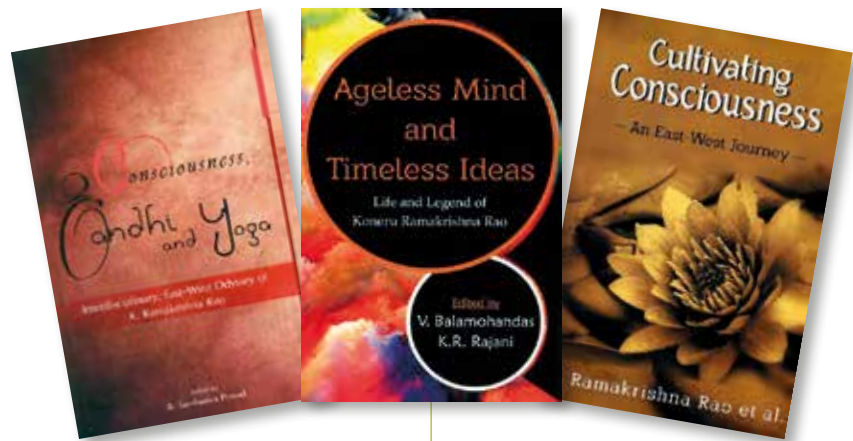
The volume consists of ten parts with 38 essays. There are sections on epistemological and ontological assumptions in history and culture, personality and social psychology, spiritual development in relation to family and culture, prayer and intentionality, mindfulness therapies, physical health and spirituality, positive psychology and spirituality, the brain and spiritual experience, then sacred consciousness and healing in terms of a postmaterial spiritual science. Each chapter contains an abstract, coverage of its area, suggestions for further research, and extensive references. All this expands and redefines the philosophy and psychology of spirituality and religion. One of the essays in the first part is very useful in spelling out theoretical and epistemological foundations for the field, with an emphasis on methodological, epistemological, ethical, and ontological metaphysical presuppositions. This is an excellent analytical piece about what the authors call positivistic naturalism, and it is interesting to note that the corresponding ethical assumption is primarily instrumental.

The essay on good and evil in religion contains some interesting work on core virtues, moral foundations and value categories across a number of different traditions, contrasting self-transcendence with self-enhancement, love with hate, selfishness with service, and empathy with self-absorption. The paper on religion and altruism could have brought in the seminal work of Pitirim Sorokin written up in *The Ways and Power of Love* in the 1950s. In the context of my other work on character education, I found the essay on spiritual development in adolescence of great interest, as well as another on spirituality and positive youth development. This last essay provides a framework of developmental assets for young people and a useful definition of spiritual development in terms of connectedness, meaning, purpose and contribution. Clinicians will find a great deal of interest in the volume, including essays on spiritually sensitive psychotherapy, spiritual aspects of Jungian analytical psychology and the transformation of Eastern meditative disciplines into Western psychotherapy. There is good coverage of positive psychology and spirituality as well as the role of spirituality in relation to resilience and positive emotions.

The section on the brain and spiritual experience contains essays by Andrew Newberg on transformation in brain structure and spiritual experience, neuroimaging and spiritual practice by Mario Beauregard and the psychology of near death experiences and spirituality by Bruce Greyson. All three are well worth close reading as they are the result of many years of research and reflection. Bruce refers to the NDE as posing an inescapable challenge to the materialistic model of mind-brain identity by asking how 'complex cognition, sensory perception, and memory can occur under conditions such as cardiac arrest in which physiological models of mind deem it impossible. (p. 525)

In the final section, there are contributions from Stefan Schwarz and Larry Dossey nonlocality and healing, then an extensive and quite technical paper by William Tiller on knowledge, intention and matter, where he distinguishes between the knowledge pathway of *logos* as physical science and *mythos* for what he calls psychoenergetic science. He draws on great deal of research, adding information and consciousness to the physical equation of mass and energy. Gary Schwartz provides a thorough analysis of materialism and the mind-brain problem and evidence pointing towards the separation of mind from brain in relation to experiments and experiences for survival. A greater spiritual reality with consciousness as the key, he argues, will require a revision and expansion of psychological definitions of mind, its operation, limitations and potentials – probably in terms of building on the William James filter model. However, Gary is also aware that the politics and indeed the social psychology of science makes progress in this direction challenging. Amit Goswami covers some of the same ground, highlighting paradoxes and anomalies of materialist science, concluding that scientific materialism is not a valid metaphysics for science before advancing his own view of a new science within consciousness. Ethics, he states, will be based on a metaphysics that fundamentally recognises the interconnectedness of all humans, which I myself argued in my book *Whole in One* (1990), shortly to be republished as *Resonant Mind*.

In her conclusion, Lisa Miller returns to some of the themes raised in her introduction relating to a broadening of ontology, and articulating a postmaterial view where human science sees human mind as an extension of the fabric of universal consciousness - a 'consciousness-driven science'. She writes that the fact that 'consciousness exists in states other than matter expands our notion of the human brain and is the linchpin of a post-material psychology.' (p. 612) Consciousness is in us, through us and around us. Taken as a whole, the volume is a powerful argument for an expanded ontology in psychology, and I hope it will be avidly read by students and younger psychologists in the field so as to encourage them to become part of the necessary expansion and transformation of the discipline. General readers will also find a great deal of valuable material, although they will be more drawn to particular essays in terms of their own special interests. This is truly a landmark and potentially revolutionary volume that deserves the widest possible readership.



■ An East-West Odyssey

David Lorimer

■ CONSCIOUSNESS, GANDHI AND YOGA (CGY)

Edited by B. Sambasiva Prasad

DK Printworld, 2013, 360 pp., \$40, h/b – ISBN 978-81-246-0715-2

■ AGELESS MIND AND TIMELESS IDEAS (AMTI)

Edited by V. Balamohandas and K.R. Rajani

DK Printworld, 2016, 186 pp., \$20, h/b – ISBN 978-81-346-0847-0

■ CULTIVATING CONSCIOUSNESS (CC)

K. Ramakrishna Rao et al.

DK Printworld, 2014, 380 pp., \$40, h/b – ISBN 978-81-246-0717-6

Gowri Rammohan is right when he observes that Dr K. Ramakrishna Rao is to Indian psychology what Dr S. Radhakrishnan is to Indian philosophy in bringing the depth and richness of classical Indian thought into a contemporary context. Radhakrishnan was the first Professor of Eastern Religions and Ethics at Oxford and subsequently President of India and a recipient of the Templeton Prize. He has had a very considerable influence on my thinking over the past 40 years. Ramakrishna Rao deserves to be equally well-known to readers for the scope of his contribution to psychology, philosophy, parapsychology, yoga, mysticism and education. Like Ervin Laszlo and his time twin Stanley Krippner, he was born in 1932 and has made extensive scholarly contributions over a period of 60 years. He first visited Duke University and the parapsychology lab of JB Rhine in 1958, at the age of 26. Rhine had a formative influence on his thinking, and he was closely involved with his work over many years. He has held many distinguished positions, including Vice Chancellor of Andhra University, President of the Parapsychological Association, President of the Indian Academy of Applied Psychology, President of the Asian Congress of Philosophy and currently Chancellor of the Gandhi Institute of Technology and Management University (GITAM).

These three books are complementary in their coverage of Ramakrishna Rao's life, thought and central concerns. The first celebrates his 80th birthday with 17 contributions from colleagues around the world, while the second is a Festschrift of reflections and reminiscences of his life. The third volume was first published in 1992, and the new edition contains four new and authoritative essays by Ramakrishna Rao on yoga, Vedanta, Buddhism and East-West approaches to consciousness.

A good place to start is the definition of consciousness, which depends equally on context, academic discipline and culture. Rao states that consciousness in the Indian tradition is more than an experience of awareness, but rather a fundamental principle that underlies all knowing and being. The cognitive structure does not generate consciousness, but rather reflects, limits and embellishes it. It is the source of our awareness or the light which illumines the things on which it shines. (AMTI, p. 38). In his conclusion to the final essay in the third book, he characterises the Western scholarly tradition as equating consciousness with the mind and defining intentionality as its essential characteristic. The goal is rational understanding of what consciousness or mind is, and the focus is on the phenomenal aspect. By contrast, the Indian approach does not distinguish between consciousness and mind, characterising consciousness as such or pure consciousness as non-intentional, while mind is intentional. Critically, the goal is one of developing practical methods for transformation via the realisation of consciousness as such. (CC, p. 348) Rao believes that humans enjoy dual citizenship of the phenomenal and transcendental domains of consciousness, but it is striking how the transformational impulse is generally absent from the Western tradition, except more recently in humanistic and transpersonal psychology. The West is mainly concerned with knowing, while the East addresses both knowing and being.

Rao was 15 when India gained its independence in 1947. However, Indian education was still fundamentally influenced by the Western worldview, and indeed more specifically by science, especially emphasised by Nehru. There has been a tendency, also present in early anthropologists, to assume that the Western way of knowing is inherently superior,

which disregards the thousands of years of sophisticated philosophy in India, China and elsewhere. In the 19th century, Lord Macaulay stated the aim of education as cultivating Indians who were English in taste, in opinions and intellect. However, this comes at the cost of denigrating and distancing Indians from their native culture while privileging those of the West, and arguably results in a crisis of philosophical identity. In particular, Rao argues that by providing a more expansive context, Indian psychology can throw light on and resolve some of the major challenges confronting psychology, namely the consciousness puzzle, the enigma of cognitive anomalies, and the development of human spirituality.

In elucidating these topics, Rao has exhibited a commendable intellectual courage in the face of academic pressure to dismiss or ignore parapsychology. He identifies the limitations of scientific materialism with respect to both parapsychology and spirituality. He was Director of the Institute for Parapsychology in Durham, North Carolina from 1976 to 1984, and Executive Director of the Foundation for Research on the Nature of Man (also founded by the Rhines) from 1988 to 1994. He has published extensively in both fields, always with the aim of connecting them in his pursuit of 'wisdom aimed at transforming the person and society.'

CGY gives a comprehensive overview of the whole range of Ramakrishna Rao's work in psychology, yoga, parapsychology, applied psychology, philosophy and Gandhian studies. The essays are written by experts in the respective fields and make for highly stimulating reading across a wide range of issues. Max Velmans compares his reflexive model of consciousness with the Body-Mind-Consciousness Trident model advanced by Rao. This is a thorough and very instructive chapter highlighting both similarities and major differences while situating his own contribution within the Western tradition. Max provides a detailed comparative table (pp. 120-121) and highlights the importance of perspectival switching between first and third person accounts of causality.

The essay on the search for authentic self provides an illuminating contrast between Western and Eastern approaches. The authors see this as a process of becoming through being, which in the West focuses on the development of personality – 'being true to oneself' - while India emphasises an inner orientation. They discuss Sri Aurobindo and Mahatma Gandhi as case studies of people who transformed themselves in order to achieve a greater, selfless purpose. In these cases, authenticity is a process of transformation or self-transcendence rather than a narrower self-fulfilment. This makes for fascinating reading, with extensive quotations from both authors. The more holistic Indian approach also relates to community, responsibility and shared goals - it is much less individualistic and requires a degree of detachment.

A major strand of Ramakrishna Rao's work is Gandhi's applied spirituality, informed

by the philosophical principles such as *satyagraha* (truth force, a form of spirituality in action). Rao is deeply concerned by the extent of violence in our societies and equally impressed by the way in which Gandhi and others have addressed this through nonviolence. Rao writes about this himself in the final essay of AMTI, where he relates his own model to Gandhi's life, epitomised by an acute tension between higher and lower aspects of his nature. Thus, we have a constant and fundamental choice of orientation, where practice of yoga and meditation can play a critical role.

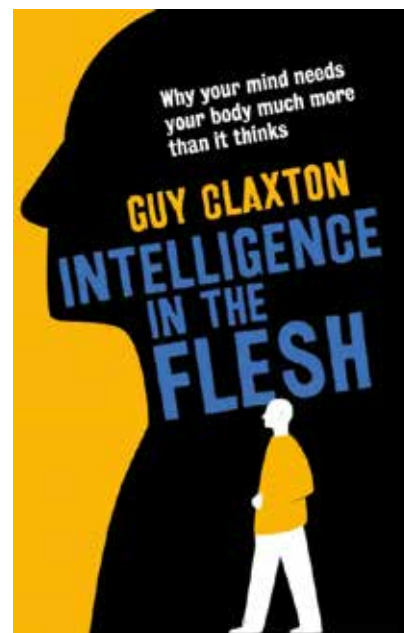
CC originates in a conference held to celebrate the centenary of the birth of Louisa Rhine in 1991. It contains many classic contributions, including an essay on metaphysical foundations of modern science by Willis Harman, with a critical commentary by Stephen Braude, an exposition of Whitehead's understanding of consciousness from David Ray Griffin, epistemological issues covered by Eugene Taylor, the importance of balancing Yin and Yang, feminine and masculine in science, an essay by Michael Grosso on imagination and healing as well as contributions from Robert Jahn and Brenda Dunne from Princeton. An interesting theme is the relationship of psi to the unconscious and subliminal perception as it presents an immediate form of knowing often only subsequently verified or falsified. Of course, a huge amount of research has been published since the first appearance of the book in 1992, but it still provides many pertinent reflections.

Many people are put off the ideas of Whitehead because of their difficulty and the fact that he invents new terminology to replace what he considers to be defective or incomplete ideas. His point of departure is experiential events, or occasions of experience, so the stuff of the mind is experience rather than consciousness. Griffin argues that consciousness itself is not efficacious, but the human mind as a whole – with its unconscious depths as well as its conscious surface - is the most powerful actuality on the face of the planet. He also discusses whether consciousness is a blessing or a curse, quoting Whitehead as saying that the function of philosophy is the self correction by consciousness of its own initial excess of subjectivity. He sees consciousness as selectively obscuring the totality, which philosophy has to seek to recover. This gives a fresh insight into the field.

Ramakrishna Rao's own contribution the body of the volume discusses some conceptual and methodological issues, covering definitions, the relationship between conscious and unconscious, philosophical approaches by Descartes, Husserl and Sartre, issues of upward and downward causation, first and third person perspectives and the role of meditation. However, his new essays on yoga, Vedanta and Buddhism are masterly expositions of these traditions and their relationship to modern psychology. His final essay, as mentioned earlier, is a wide-ranging consideration of Western and Eastern approaches also covering Western

phenomenology and existentialism. It provides a fitting summation to the themes covered in all three books.

Ramakrishna Rao's prodigious output over the last 10 years has amounted to over 5,000 pages, including the magisterial *Cognitive Anomalies, Consciousness and Yoga*, which I reviewed for the Journal of Consciousness Studies. He is an interdisciplinary giant who has integrated his ideas across many disciplines, while never losing sight of the fundamental importance of wisdom, the process of spiritualisation, and applied spirituality addressed to the fundamental challenges of our time.



■ Busy Bodies make Clever Bodies

Olly Robinson

■ INTELLIGENCE IN THE FLESH: WHY YOUR MIND NEEDS YOUR BODY MUCH MORE THAN IT THINKS

Guy Claxton

Yale University Press, 2016, 344 pp., £12.99, p/b - ISBN 978-0300223477

The work I do as an academic is really rather unhealthy. It involves countless hours of staring at computer screens, tapping away at keyboards, with my eyes and body stuck in a fixed and rather unnatural posture. Even when I am away from the computer, my attention at work is usually in some cognitive matter, and hence away from my body and environment. This combination of heavy-duty rationality and a lack of bodily movement is tailor-made to cause imbalance. I use dancing to help solve this problem. I go out as regularly as I can to '5 Rhythms' classes, or other ecstatic dance workshops, to help feel physically alive, vital, real, present and full of emotion. Every workshop feels like a

remembering of my true embodied self and a temporary release from the fictional junk of my cognitive self-concepts.

Given this passion of mine, I was excited to read Guy Glaxton's book *Intelligence in the Flesh*, which synthesises his ideas on how intelligence is a function of the whole body. Claxton relays how society has become more sedentary over time, and its pastimes ever more disembodied. Even things that used to involve complex bodily action, such as cooking, for many now simply involve ripping off a lid and putting a tray in a microwave. Meanwhile, psychology and philosophy have been taking intelligence away from the body for some centuries now. Intelligence tests typically require little if any bodily work or physical activity and instead emphasise abstract reasoning or memory. In sum, culturally and academically, we have been displacing the body as the foundation of wisdom or cleverness. We need to reclaim the wisdom of the body – this is the core message of the book.

For Claxton, the body is the basis of all intelligence. Reason comes from nowhere else, in his view. There is no Platonic realm, no Higher Source, no mind or soul distinct from the complex operations of body. We have evolved physically, we are made for action, and there is no dividing line between brain and body. It is all one intelligent system. The mind and consciousness 'well up' out of the body's working.

The whole discussion of how *brain* and *mind* relate, says Claxton, is mistaken. The *body* is the mind's substrate, not just the brain. Thoughts, feelings, intuitions, values and concerns all are expressions of total bodily events that incorporate the nervous system, immune system, circulatory system and more. Our blood sugar changes in response to thoughts, our thoughts respond to bacteria in our intestine. Hence studies show that people make better decisions when they rely on their physical intuition – their gut feelings. The brain is more like a chat room than a directorate.

Feelings and emotions are the glue that keeps the embodied system together. They bring the whole organism into a kind of action-focused alignment, and demand expression. If feeling is not properly expressed, it becomes confused and loses its natural wisdom. Any divorce of thought from feeling creates a kind of 'clever-stupid' intelligence (which, in my experience, is all too common in academia).

Thinking, from the Claxton's embodied cognition theory, is a series of stories that the body constructs about what is going on in its inner depths. There is no other unconscious than the unconscious depths of the body and our lack of conscious access to its finer workings. This does not leave room for an unconscious that is akin of Jung's model or Huxley's. There is no extended 'Mind at Large' beyond our conscious bubble. The unconscious is just the operation of matter and physical information beyond our ken.

Claxton's materialism, while not leaving much if any room for God, transcendence

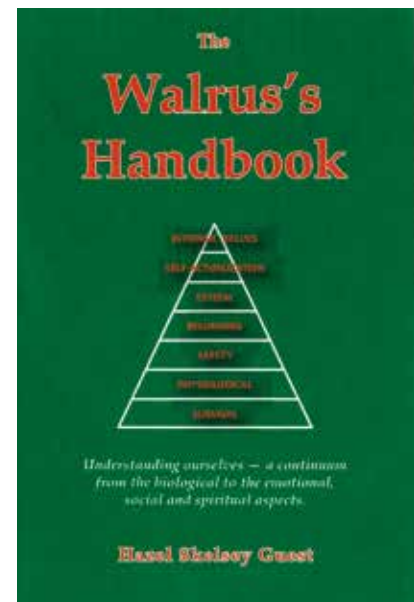
or paranormal phenomena, does provide for a spiritual sense of unity, albeit a radically immanent one. We are one with the cosmos, being not rational souls inserted in the physical world, but integral parts of the material whole. We flow out into the world beyond our skin. To open to the wisdom of the body means opening to its porous nature – accepting that it has no clear edges. Every breath in draws atoms from the world into us, and every breath out expels atoms from one's inside into the outside world. Every learning event draws information in, and every sentence spoken sends it out. Embodied intelligence works with this in adaptive and functional ways. Tools and technologies become seamless parts of systems that include the physical body, while information flows seamlessly inside and outside the body, connecting us intimately with the world and each other.

In the final two chapters, the book discusses whether and how embodied intelligence can be taught, and what it means for education. Why do we make children sit stock still through class, says Claxton, when intelligence benefits from moving around and from gestures? And then we pathologise those kids who want to move around as having an attention deficit disorder! This is such an important message, and one that needs to be echoed throughout the education system, including higher education, where we have also forgotten the power of learning through action. Claxton calls for a New Materialism, which embraces the importance of making, doing and moving in the physical world.

Claxton considers various ways that we can rehabilitate our somatic intelligence – he briefly reviews the effects of biofeedback, mindfulness meditation, exercise, tai chi and dance. I did feel a little short changed that dance only got about half a page of coverage, and exercise only three pages. I felt the book missed out on a chance of extensively exploring the research that is out there on the benefits of exercise, yoga and dance. And given Claxton's expertise on Buddhism, I was hoping for a bit more on spirituality in the book.

Overall, Claxton's basic thesis is important and convincing. We *must* learn to re-engage with our bodies and their extraordinary capacities. Like him, I believe that the whole body is indeed the locus of feeling, memory and thinking. However unlike Claxton I am not a materialist, and I don't share his view that the physical is all there is, when it comes to intelligence and consciousness. I expect that is also true of many readers of the Network Review, given that the Scientific and Medical Network is in large part about exploring alternatives to scientific materialism. But if I was going to read a book that had a philosophically materialistic foundation, it would be this one. It shows just how healthy and wise materialism can be.

Olly Robinson is Senior Lecturer at the University of Greenwich and author of "Paths Between Head and Heart: The Seven Harmonies of Science and Spirituality", to be published in 2017 by O Books.



■ Remedy for a New Era

Gunnel Minett

■ THE WALRUS'S HANDBOOK, UNDERSTANDING OURSELVES - A CONTINUUM FROM THE BIOLOGICAL TO THE EMOTIONAL, SOCIAL AND SPIRITUAL ASPECTS

Hazel Skelsey Guest (SMN)

Archive Publishing, 2016, 229 pp., £19.95, p/b - ISBN 978-1-906289-29-4

The year 2016 marked the beginning of a new era - the Post-Truth Era. And only a couple of days into 2017 we have learnt about 'alternative facts'. This describes a new trend, where people are becoming indifferent to whether the information they are given and/or pass on is true or false. This applies in particular to social media and propaganda spread by ruthless politicians and people willing to do anything to take advantage of people's ignorance for their own benefit. The need for independent data with confirmed validity has all of a sudden become less important. This new trend is completely opposite to a tradition that is as old as human history, to turn to elders for their wisdom, accumulated over a life-time of learning, research and fact-testing.

This is why this book feels so reassuringly different and old-fashioned in the best possible senses. In it the author is sharing her knowledge of human behaviour and the psyche, which she has acquired over a lifetime as a teacher and psychotherapist. To illustrate both psychological, emotional, social and spiritual aspects of human life she relates them to two theoretical frameworks; firstly, Maslow's very well-known *Hierarchy of Needs*, that illustrates which of our inner forces impel us to act in a certain way, and secondly, to the *Scale of Responses* and *Sequential Analysis* from the

lesser known Jungian psychotherapist, Dr Ian N Marshall, to highlight our reactions, i.e. how and why we respond in a certain way in a specific situation.

The first part of the book focuses on Maslow's theories, particularly his later, revised hierarchy of needs which includes intrinsic values. By illustrating the theory with anecdotes from her own practice, as well as current world events, this account becomes very accessible and entertaining, even for those with no previous knowledge of this field. Drawing on this clear and well tested theory of the human psyche helps clarifying behaviour that otherwise can be misunderstood or misinterpreted. In particular, in these times of turmoil and friction between people from different backgrounds who are trying to live together in a shrinking world, it can be a great help to see how much we really have in common rather than being alienated by our differences.

We have things in common, not just with other human beings, but also with other animals. The author points to animal research which has established many similarities between us and other species. There is, of course, an ongoing, intense and important debate on animal welfare and environmental issues. So it's particularly helpful, given that 'environmental deniers' have recently been elected to powerful positions in the world, to see how much we can learn from studying other species. (The arguments presented in the book has received recent backing from TV programmes showing animals in the wild, displaying emotions such as grief and loneliness which were previously thought to be unique to human beings. It also shows how much animals learn their behaviour from each other.)

The second part of the book focuses on Dr Ian Marshall's *Scale of Response* and *Sequential Analysis*. This too illustrates how human behaviour is influenced by the environment: basic reactions can be positive or negative depending on outer circumstances - something to remember before we judge behaviour in others which might seem to come directly from some sort of inner evil rather than desperation and despair in a hopeless situation.

The title of the book comes from Lewis Carroll's book *Through the Looking Glass: 'The time has come, the Walrus said, to talk of many things'*. It refers to the fact that the author decided to present the wisdom acquired over a lifetime of experience and research, at the age of 87. In this new era of Post Truth, to be willing to take time to collect thoughts and experiences, and share it with the rest of the world, is something to be appreciated and treasured by all. Something we all should be doing when we feel we are approaching a more mature age, as a gift to future generations.

On the positive side, our new information age has made it much easier to share our knowledge with others. Publishing a book no longer requires the mediation of a publisher. It can easily be achieved in the form of

electronic books which are accessible online in all parts of the world. In fact, I think elders sharing their wisdom is so important that organisations such as SMN, which represents a different, more thoughtful and serious approach to research and fact-based knowledge, should lead this initiative and encourage its member to follow the example of Hazel Skelsey Guest by writing down the wisdom they have accumulated over a lifetime. Furthermore, it is certainly high time to try to counter the Post-Truth era, which seems to be taking over our world. Otherwise future generations may struggle to find their way back to a more balanced outlook on life.

■ Emancipatory Enaction

David Lorimer

■ PARTICIPATION AND THE MYSTERY

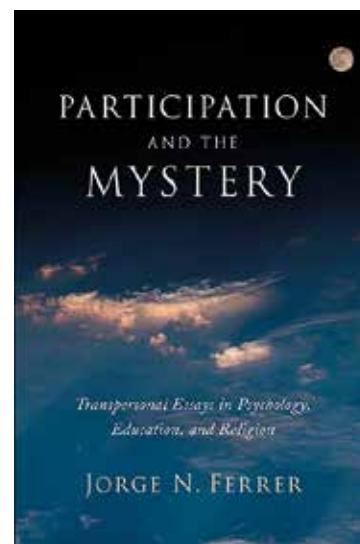
Jorge Ferrer

SUNY Press, 2017, 376 pp., \$95, h/b – ISBN 978-1-4384-6487-9 (paperback forthcoming)

Jorge Ferrer is Professor of East-West Psychology at the California Institute of Integral Studies, author of the seminal *Revisioning Transpersonal Theory: A Participatory through Vision of Human Spirituality*, and co-editor of *The Participatory Turn: Spirituality, Mysticism, Religious Studies*, both of which were reviewed in these pages. Jorge is the foremost theorist of participatory spirituality and, as such, these brilliant new essays are required reading for anyone seriously interested in spirituality, psychology, religion, mysticism, philosophy of science and education. There are nearly 100 pages of notes and references. The three parts are devoted to transpersonal psychology, integral education and some reflections on spirituality and religion, particularly a critical engagement with the work of Stan Grof and Ken Wilber.

The first essay on participatory spirituality defines its approach as emerging from 'human co-creative participation in an undetermined mystery or generative power of life, the cosmos, or reality' (p. 10) - in an appendix he explains his use of the term undetermined to distinguish it from indeterminate and to leave open the possibility of determinacy and indeterminacy within the mystery. Likewise, he has substituted the word 'mystery' for 'spirit'. The participatory approach denies the existence of pre-given ultimates and/or single traditions but is also critical of post-modern reduction of religion to a cultural-linguistic artefact - this means that the approach is essentially enactive and co-creative. Jorge provides a useful map of participatory spirituality with different forms of co-creation - transpersonal, interpersonal and intrapersonal, each with its principles, challenges, tests, regulative goals and direction. (p. 12)

This provides an excellent theoretical framework as well as three practical tests that can be applied to any spiritual tradition: the egocentrism test relating to the overcoming of self-centredness in practitioners, the dissociation test addressing the extent of fully



embodied integration, and the eco--socio-political test 'assessing the extent to which spiritual systems. The ecological balance, social and economic justice, religious and political freedom, class and gender equality, and other fundamental human rights.' (p. 203) I agree that this approach invites 'a more nuanced, contextual, and complex evaluation of religious claims' based on results rather than any a priori conditions.

The second essay on transpersonal psychology, science and the supernatural is a penetrating analysis and critique of the tendency within psychology to try to align itself with science by claiming a metaphysical neutrality or agnosticism. It is apparent that Harris Friedman, editor of the *Wiley-Blackwell Handbook of Transpersonal Psychology*, is trying to restrict the field to exclude the existence of transcendent realities, which is an implicit acknowledgement of orthodox naturalism and a denial that science also contains metaphysical assumptions; indeed, naturalism is itself a metaphysic. Jorge sees this in terms not only of Western ethnocentrism, but what he calls epistemic colonialism that critically filter traditional supernatural claims and claim to be the final arbiter on their validity. Jorge argues for a critical but sympathetic engagement with other worldviews and ways of knowing. He is also right in criticising what he calls cognocentrism, both in education generally and psychology particularly. More on this below. He steers a middle course between both perennialism and scientism, both of which commit transpersonal psychology to a single metaphysical worldview - either transcendentalist or naturalistic. The participatory approach is open to multiple metaphysical possibilities and state-specific insights (p. 62).

The chapters on integral education assert that modern Western education 'emphasises the development of the mind's rational and intellectual powers, paying little attention to the maturation of other ways of knowing.' (p. 55) This is a good definition of cognocentrism and highlights the lack of development in kinematic, emotional, aesthetic, intuitive and spiritual intelligences. In this respect,

Jorge could have drawn on the work of Iain McGilchrist on the implications of left and right hemisphere thinking for culture, but this reference is missing from his coverage. Integral education is also transformative and demanding at different levels. Jorge describes the work of Marina Romero and Ramon Albareda addressing body, vital, heart, mind and consciousness in a co-creative process of unfolding learning and enquiry. This makes very interesting reading, especially the incorporation of the vertical dimension reconnecting education with transformation and spirituality. As Jorge points out, expanded intellectual understanding does not equate with genuine integral knowledge; the former can remain lopsided and exclusively mind-centred.

This leads on to the incorporation of embodied spiritual practices and the overcoming of disassociation from the physical and alienation from nature and the feminine. Embodied spirituality takes in all human dimensions as equal partners; its goal is integration rather than sublimation, which includes listening to the body as a source of spiritual insight, the resacralisation of nature, sexuality and sensuous pleasure, and rediscovering the mystery in its immanent manifestation rather than simply seeking the transcendent beyond the body and the world. All this is in the service of liberation. These insights are incorporated in the chapter on teaching mysticism from a participatory perspective, perhaps the most wide-ranging methodology I have read about anywhere and which is at once integral, experiential and transformative. These methods are further elaborated in a chapter on embodied spiritual enquiry as a radical approach to contemplative education.

The critical chapters on Stan Grof and Ken Wilber provide readers with a useful participatory view by questioning the privileging of a non-dual monistic metaphysics with a pre-given ultimate spiritual reality. Jorge's approach, as indicated above, is enactive, co-creatively bringing forth new insights which are bound to be culturally conditioned in some respects. He uses the analogy of the ocean of emancipation having different shores, which also allows for new evolutionary spheres to develop, which do not apply a hierarchical scheme, as advanced by Wilber. As Tim Freke points out in *Soul Story* (see his article and my review in the last issue), these realms must have developed alongside cultural evolution. The final chapter discusses religious pluralism and the future of religion, with a number of scenarios that let a thousand spiritual flowers bloom, intrinsically valuing diversity and mutually respect. Thus one can achieve a sense of belonging to a common spiritual family committed to spiritual individuation and responsible transformation of the world in ecological, sociological and political dimensions.

One other concept new to me was that of 'open naturalism' as a result of realising that the dichotomy of naturalistic/supernaturalistic is itself problematic and arises from the theology of mediaeval Christianity. Modern scientific naturalism is particularly

committed to rejecting any supernatural causes, agents or principles. Open naturalism allows a more expansive view that is free from materialism and reductionism and is therefore open to the plausibility of subtle dimensions of reality. Similarly, Jorge questions the sharp distinction between transcendent and immanent, preferring the use of the word subtle. I found it useful to question these widely accepted dichotomies as a way of loosening up categories. After all, the participatory integrates subjective and objective in its approach. Overall, the volume is highly stimulating and thought-provoking in articulating a participatory perspective across a number of disciplines and challenging us to become more integral, embodied and responsible.

■ Rethinking the Science of Consciousness

David Lorimer

■ TRANSCENDENT MIND

Imants Baruss and Julia Mossbridge

American Psychological Association, 2017, 249 pp., \$69.95, h/b – ISBN 978-1-43382-77-3

It is encouraging that such a radical book has been published by the American Psychological Association as it goes way beyond conventional psychological thinking, as is apparent in the first sentence: 'we are in the midst of a sea change. Receding from view is materialism, whereby physical phenomena are assumed to be primary and consciousness is regarded as secondary. Approaching our sites is a complete reversal of perspective: according to this alternative view, consciousness is primary and secondary.' (p. 1) Imants Baruss is Professor of Psychology at King's University College at Western University Canada, where he has been teaching undergraduate courses about consciousness for nearly 30 years. Julia Mossbridge is an experimental psychologist and cognitive neuroscientist at the Institute of Noetic Sciences and a visiting scholar at Northwestern University. The reversal of perspective referred to will be familiar to many readers, although they might find the confident tone overoptimistic in view of the evident strength of resistance and the social psychology of confirmation bias.

With over 35 pages of references, the authors draw widely on research and consider the full range of parapsychological phenomena implying a shared mind, rethinking time, separation of mind from brain, direct mental influence and openness to the transcendent mind of the title. There is no doubt in my mind that if one applies William James's principle of radical empiricism there is ample evidence to justify a fundamental reversal in our understanding of consciousness, but very little of this literature is read by mainstream neuroscientists, whose working hypothesis remains that brain produces mind. Such is the general prejudice that member and Nobel laureate Brian Josephson received a note from a conference organiser that due to his research interest in the paranormal,

his presence would not be appropriate at a scientific conference. He subsequently learned, incredibly, that it was feared that his presence might damage the career prospects of students attending.

The authors give a brief history of materialism, which they show has been transcended by physics itself. They take considerable trouble to define various meanings of consciousness as referring to subjective events suffused with existential qualia that occur privately for a person (p. 15). They detail not only evidence for phenomena anomalous in terms of materialism, but also strategies for approaching the area, which they subject to critical scrutiny. They feel that materialism as a philosophy is like a dyke holding back the water of knowledge. They rightly point out the close correlation between beliefs about consciousness and reality in terms of worldviews. The overall approach nicely balances open-mindedness with rigour.

In looking at shared mind, they review evidence for remote viewing, telepathy and psychokinesis. Some readers may be familiar with the CIA parapsychology programme at Stanford Research Institute, which lasted from 1973 to 1995. During this period, 1,215 remote viewing trials were performed, and already in 1996 statistician Jessica Utts concluded that 'using the standards applied to any other area of science, it is concluded that psychic functioning has been well-established.' Yet, more than 20 years later, sceptics still claim that there is no evidence for psi - in this respect they resemble the cardinals who refused to look through Galileo's telescope. In discussing the theoretical basis of shared mind, the authors could have referred to the extensive work of Ervin Laszlo on the Akashic field, and, historically, New Thought ideas about a universal mind, for instance in the work of Thomas Troward.

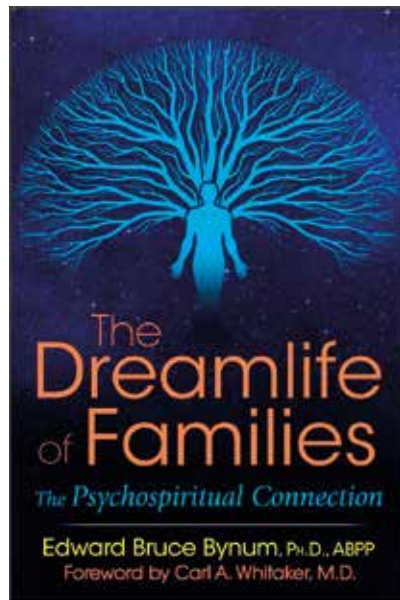
Moving on to their treatment of time, the authors discuss its centrality to consciousness and experience as well as evidence for pre-sentiment, precognitive dreaming and precognitive remote viewing. Interestingly, they consider the implications of the life review for our understanding of time, as this seems to compress a lifetime into a few seconds. Then we can also experience timeless states, which I would not personally interpret as time 'coming apart'. This leads them to postulate a deep time distinguished from subjective apparent time. The next chapter looks at evidence for contact with the dead, including spontaneous cases and mediumship, and they consider the relative merits of superpsi versus survival as a plausible explanation. In their treatment of near death experiences, the authors point out the paradox that 'the less the brain is able to function properly, the more vivid the experiences that are occurring' and in this respect they could have cited the Auckland Geddes case as an argument in their favour. Of course, mental functioning in the afterlife implies mind without any brain, not just mind separable from the brain.

Various forms of direct mental influence are investigated, including random event generators, remote healing, poltergeist activity, macro-PK and the extraordinary case involving the rapid disappearance of Anita Moorjani's terminal cancer following her NDE. They also discuss the 'fictitious ghost' Philip, ostensibly created by a group of Canadian researchers, but I have always wondered if someone on the other side was in fact having a joke at their expense. The next issue is reintegrating subjectivity into consciousness research, where the authors point out that first person observation is in fact at the core of science, and that careful observation is a skill to be learned, to which they devote a separate section. They also cover phenomenology, psychophysics and psychophysiology as well as arguing for self-development in consciousness researchers.

Finally, we come to the title of transcendent mind from a post-materialist perspective. One of their core contentions is that conditioned ways of thinking have displaced empirical evidence, hence the need for this book to define a new scientific footing for consciousness research. In considering a possible explanatory model, they quote the filter theory advanced by Aldous Huxley, whom they wrongly call an American writer, but, oddly, they make no mention of William James's seminal lecture on immortality where he discusses in detail the philosophy of a filter model, some of which he derives from the much less well-known work of Oxford philosophy don FCS Schiller, whose 1891 book *Riddles of the Sphinx* is perhaps the most comprehensive statement. They themselves advance what they call a flicker-filter model based on the sequence of nows where a more permeable filter would open up access to material in deep consciousness.

Finally, the authors suggest ten guidelines for future research in consciousness based on a deeper questioning and a more open yet systematic and rigorous approach, which also has clinical implications. Interestingly, they recommend self-development as necessary for deepening one's understanding of the nature of consciousness and reality: we ourselves need to open up and evolve. This book is a very thorough investigation

of consciousness research that should appeal to rigorous yet open-minded scientists who are prepared to engage fully with the evidence and think through its implications for the nature of reality.



■ **“Life is but a Dream”**
Gunnel Minett

■ **THE DREAMLIFE OF FAMILIES, THE PSYCHOSPIRITUAL CONNECTION**

Edwards Bruce Bynum, PhD, ABPP
Inner Traditions, 2017, www.InnerTraditions.com, 275 pp., £14.99, p/b – ISBN

Although we still have a lot to learn about dreams, why we have them and what they mean, we can conclude that they play a big part in our lives. As this book points out, they often represent a true expression of our innermost thoughts, a version that is uncensored by the conscious mind. They can also express our connection with others, family and friends, past and present in ways we normally would not perceive them. Dreams can also solve problems of all kinds both past, present and future ones.

From perhaps a somewhat unexpected environment, I can give a personal example everyday ‘problem solving’ via dreams from my own past history when I worked in a bank. Despite an otherwise very conservative environment, we had a well establish method of solving mistakes we had made during the day, which usually meant the embarrassing situation of giving customers too much or too little money. When we could not find where we had made the mistake, we were told to go home and sleep on it. Mostly this had the effect that the person in question came back the next morning having ‘remembered’ in a dream where they had made the mistake.

In his book, Edward Bruce Bynum presents a comprehensive and integrated view of traditional dream analysis and family psychology both from a clinical science approach, but also drawing on old traditions from Africa, China and India and from parapsychology. He explains and illustrates with numerous examples how our individual

unconscious is part of a larger collective or family unconsciousness and how dreams can express this.

One of the really positive aspects of the book is that it approaches our interest in dreams both from a current and historical angle: it points to the way we lived in (extended) family groups and the role dreams played there. This ancient way of life may often be dismissed as superstition based on ignorance (‘now we know better’). But, as the author points out, even if we now live more isolated lives, and have more individual freedom, the extended family can often have a positive effect on our inner wellbeing. We seem to have a need to get so close to others that we can share both their conscious and unconscious life in the form of dreams.

However, going back to closer family ties doesn't necessarily mean returning to the biological family. Such a return to closer family ties would probably demand an impossible amount of change in our modern societies. But an ‘extended family’ does not have to be biological. As Steve Minett describes in his book *Gazing at the Stars*, well managed family constellations aimed at providing the optimal environment for child care can be a very good solution for adults as well as children.

Bynum's book is full of recorded dreams that reflect both major and minor events in our lives such as illness, birth and death and medical emergencies, that all seem to have a special effect on our dreamlife. These dreams can also be simultaneous shared dreams, telepathic or precognitive dreams. Regardless of the fact that these types of dreams may not have an explanation within our current scientific paradigm, they most certainly appear often and strongly enough to be taken seriously, which is exactly what this book is doing.

ECOLOGY-FUTURES STUDIES

■ **Will it be Enough?**
Chris Thomson

■ **NO IS NOT ENOUGH**
Naomi Klein

Allen Lane, 2017, 288 pp., £12.99, p/b - ISBN 978 - 0241320884

Living in the Catalan Pyrenees, it is easy to forget about the outside world. The seasons come and go. Wildlife is very evident. Beauty and peace are ever-present. And people here in the country go about their lives, peaceably, more or less as they always have. All feels well with the world.

Of course, all is not well with the world. A greedy, amoral narcissist occupies the Oval Office. That alone is serious cause for concern. To make it worse, he has surrounded himself with very rich men who see it as their mission to undo much of the genuine progress made in the last 100 years or so. As Naomi Klein says...



“The goal is all-out war on the public sphere and the public interest...In their place will be unfettered power and freedom for corporations...The people who already possess an absolutely obscene share of the planet’s wealth are determined to grab still more.”

The situation is so serious that Noam Chomsky has started referring to the Republican Party as “the most dangerous organisation in human history”, because it is recklessly, but deliberately, bringing the world closer to nuclear war and environmental disaster. One way or another, this is going to affect you and me, even if we live in isolated places. Trump and his cronies have just made it very personal.

In her latest book, Naomi explains why Trump is in the White House, and she then goes into detail on the great damage that neoconservatives and neoliberalism are doing to the world. Although it can be depressing read at times, because the damage is so deep and widespread, the book keeps holding out hope in the form of the many local and international initiatives being taken to counter Trump and all that he stands for. That said, there were moments when I wondered whether the book’s title should have been “Will it be Enough?” I will return to this theme shortly.

It is important to note, as the author points out, that Trump is not an aberration. On the contrary, he is the ideal figurehead for the corporations and the elite. He provides false hope for one half of the population and a convenient target for the other half. Indeed, Trump is the logical culmination of three important trends – neoliberalism, brands, and reality television. The first of these should need no explanation. Suffice to say that it can summarised (in the style of Orwell) as “private good, public bad”. The other two trends may need a little explanation.

Although Nike and Apple and other big companies sell things, much of their value is in their brands. Thus, when people buy their products, they are to some extent buying into a fantasy. This is why, for example, Nike is able to sell very ordinary trainers for up to \$300. Naomi goes into some detail about the way Trump is using the Presidency to continue to promote brand Trump (as well as those of his family). This partly explains

the Trump phenomenon. Another part of the explanation is reality television. If you know anything about The Apprentice, the TV programme that Trump hosted, you will know that it was largely about humiliating the “losers”, of which there were many, and glorifying the one “winner”.

There were no rules - the norms of decent discourse were nowhere to be seen. Insults and lies were the norm. This is exactly how Trump behaved during the election campaign, and how he continues to behave in office. It is the most plausible explanation for his precocious lying, and for the fact that he seems to be able to do this with impunity. Any other President would have been impeached by now. Not Trump, as he continues to entertain his followers and, it has to be said, much of the media. It is no coincidence that he was once involved in professional wrestling, which surely has to rank as one of the most fake activities of all time.

Now, all this would be comical, were it not so serious. And it is very serious indeed. Noam Chomsky is also fond of telling us about the Doomsday Clock, an assessment by some eminent people of how close we are to annihilating ourselves. The Clock has never been so close to midnight. What makes the situation even more urgent is that we have “a parcel of rogues” in the world’s most powerful rogue state pushing the minute hand ever closer. So, what do we do? Many of us feel impotent, given the scale of the problems and given the quantity of money and power ranged against us. One thing is clear, as the book’s title suggests – just protesting is not sufficient. In Naomi’s view “two crucial things have to happen. First, we need a firm grasp on how shock politics work and whose interests they serve...Second, we have to tell a *different* story from the one the shock doctors are peddling.”

It was at this point in the book that I began to have doubts. A lot of people have been telling different stories for a long time. To give just one example, the New Economics Foundation has been describing and promoting a different kind of economics and a different kind of society since its inception at the end of the 80s. There are countless other examples of “different stories”. All of us can think of many. Yet the fact is that inequality continues to grow, materialism is as rampant as ever, military spending is huge while welfare is cut and, to crown it all, the biosphere is more threatened than ever. This is not a counsel of despair, but one does wonder at the combined effect of the many different stories. Are they making sufficient impact? One, not unreasonable, ray of hope is that this latest power grab by the elite is so naked that the small boy will not be alone in noticing that the Emperor has forgotten to dress himself. Perhaps the Trump phenomenon is so outrageous that it will cause many to wake up. I hope so, and perhaps they will, but people tend to fall asleep again rather too quickly.

Much of the book is an uncomfortable narrative on how those in power are damaging individuals, societies and this planet. Many of you will be familiar with this narrative. The aftermath of Hurricane Katrina is just one

of hundreds of horror stories – incidentally involving the current Vice-President - in which the insatiable greed of the rich caused untold misery for the poor and the vulnerable. In my view, Naomi really gets to the point when, talking about the 2008 financial crash, she says:

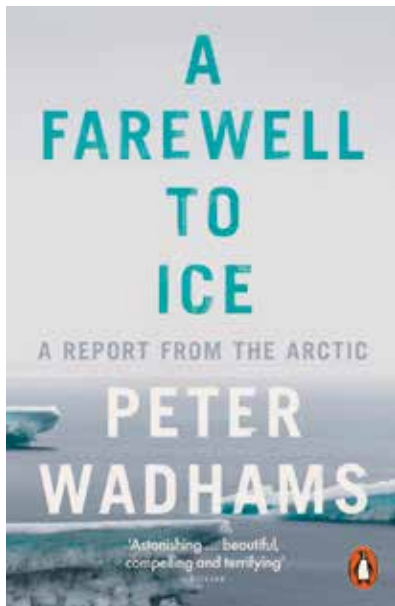
“When the failures of the current model revealed themselves in a manner more spectacular than at any point since the Great Depression, we did not collectively seize that moment to grasp the whole of history and swerve...The bottom line is that in 2009 too many of us were waiting for change to be delivered from on high. And by the time most of realised how inadequate that change was, the window had closed.”

And the remedy? Short of a miracle, in which humanity as a whole suddenly becomes wise and intelligent, there is no magic cure. Naomi describes some of the many initiatives that have taken place since the WTO protests in Seattle in 1999. Some of these have been successful within their own limits. However, the fact remains that there has, to date, been no massive supervening movement on the scale required to stop neoliberalism and neoconservatives in their tracks, and replace them with something that reflects our true humanity. Perhaps the Leap Manifesto (<https://leapmanifesto.org/en/the-leap-manifesto/>) described towards the end of the book will the new beginning that we all long for. One can only wish.

Although Naomi writes well, is a powerful campaigner, and makes some compelling arguments, I remain doubtful. The bottom line for me is: do we have the will, and do we have the strength? Speaking personally, I am not sure. Would I give my life, literally, for this cause – the survival of humanity? I suspect that things would have to feel even more desperate. All of us have our breaking point. That much is clear. But few of us have been put to that ultimate test. If we hope to reverse the damage and create a better world, what we do will have to be unprecedented, given the unprecedented nature and scale of the challenges. This almost certainly means that we will have to be stronger and more determined than we have ever been. All this puts me in mind of some lines from one of my favourite poems, “On A Raised Beach”, by Hugh MacDiarmid...

*“Let men find the faith
that builds mountains
Before they seek the faith
that moves them.
Men cannot hope to survive
the fall of the mountains
Which they will no more
see that they saw their rise
Unless they are more
concentrated and determined,
Truer to themselves
and with more to be true to,
Than these stones,
and as inerrable as they are.”*

Chris Thomson is the author of *Full Spectrum Intelligence*.



■ Emit Now, Remove Later?!

David Lorimer

■ A FAREWELL TO ICE

Peter Wadhams

Allen Lane, 2017, 240 pp., £20, h/b – ISBN 978-0-241-00941-3

Peter Wadhams was Professor of Ocean Physics at Cambridge from 1992 to 2015, and has devoted his entire career to the study of the Arctic, making more than 50 expeditions to both polar regions. As such, we should take his 'report from the Arctic' very seriously as it is based on research and first-hand experience, not just on extrapolating computer models. Readers can consult his own literally chilling summary in the Articles section. In contrast with the first pictures from 1969, photographs from space show the top of the world in northern summer as blue rather than white. I have been following the Arctic debate for a number of years, and think it is right to assert that the sea ice situation is the canary in the mine of planetary climate change.

The book begins by explaining the background of the Arctic, the nature of ice, the history of ice on planet Earth and the modern cycle of ice ages. It is striking that previous geological changes took place over thousands of years, while the current global warming to 404 ppm of CO₂ in the atmosphere has occurred in less than 100 years. The average concentration of CO₂ during interglacial periods is 280 ppm, falling off to 180 ppm during ice ages. Peter then explains the nature of the greenhouse effect and the direct correlation between adding carbon dioxide to the atmosphere and temperature rise (p. 52). Greenhouse gases produce 'radiative forcing' that upsets the natural thermal balance of the planet, while 'Arctic amplification' explains why changes due to global warming happen first in the Arctic.

Peter then moves on to the history of Arctic sea ice melt back, using his own data both

in terms of extent and thickness. Even by the 1990s, the ice thinned by 43% relative to the 1970s and the overall pattern is inexorably downwards, as illustrated in a chart showing what he calls the death spiral of Arctic ice. A further factor - precipitated by open water - is that wind can further break up the ice. The history is illustrated with useful comparative charts. The key question is whether we have passed the tipping point in terms of the possibility of substantial multi-year ice cover to reform. Peter thinks we may well have, and is critical both of scientists who rely on models rather than data, and more seriously of the IPCC 2013 report, which relies on a linear rather than nonlinear analysis and contains some dubious statistics (p. 90).

His next chapter explains eight forms of positive feedback that are likely to accelerate the melting effects. The most serious of these are ice-albedo and snowline retreat feedbacks, whose combined effects amplify the radiative forcing effect of CO₂ by 50%. Then we should not forget ocean acidification feedback, which has already had a catastrophic effect on marine life and coral reefs. Arctic methane is described as a catastrophe in the making that could potentially lead to a further temperature rise of 0.6°C by 2040. As Peter points out, this is surely a case where the precautionary principle and proper risk analysis are urgently required. It is also possible that this could be amplified by permafrost melt. Some of our disruptive weather patterns seem to be due to increased meandering of the jet stream, also related to Arctic warming. The mechanisms are by no means clear, and Peter cites a number of models and references. However, disruptive weather is likely to exacerbate volatility in food production, especially as population is forecast to increase to 9.5 bn by 2050 and 11.2 bn by 2100.

There is a very interesting chapter on the Antarctic, where Peter explains their very different situations and ways in which sea ice is formed. The advance of sea ice in that region is often cited by sceptics as a criticism of global warming, but the situation is in fact more complex with regional variations, and it is likely that changing wind patterns are a critical explanatory factor. The Pacific sector has in fact warmed twice as fast as the rest of the continent so that while the western sector is shrinking, the eastern sector is growing, resulting in a slow net growth. However, this does not alter the fact that it is the Arctic feedbacks that will determine the rate of global warming.

Peter now turns to the state of the planet, arguing that CO₂ at 404 ppm is already too high for non-destructive climate change, especially as carbon emissions are not even beginning to slow. He returns to the question of population, showing that the population of Africa is anticipated to quadruple between 2015 and 2100, even though it is already in a situation of not being able to feed itself. Personally, I find these projections extraordinary, precisely for that reason. Peter rightly notes that our current financial and economic system cannot lead to a sustainable

equilibrium society. The magnitude of the challenge is illustrated by asking how long it would take to reduce current CO₂ levels from 404 ppm to 280 ppm if we stopped emitting CO₂ altogether. Due to the survival time of the gas, it would take 45 years to bring the level down even to 350 ppm, so further increase looks inexorable, not least because carbon remains in the atmosphere for 100 years.

So what can be done about it? An important part of Peter's recommendations is the urgent need for a new Manhattan Project to clean up our atmosphere. He references the important 2009 geo-engineering report from the Royal Society explaining two possible approaches of solar radiation management and carbon dioxide removal. SRM in terms of stratospheric aerosol spraying is at best a sticking plaster, as he points out, since it does nothing about the causes of global warming nor does it affect ocean acidification. More seriously, it requires constant application and the toxic chemicals fall back down to earth, which may also have an effect on water and food. In my review of *Experiment Earth* in the last issue (p. 54), I cited evidence that this may already be occurring, and will ultimately result in white rather than blue skies. Peter also discusses carbon drawdown and the possibility of direct air capture, which is not yet been developed. He also mentions new forms of nuclear power using pebble bed and thorium reactors. The need for geo-engineering is a drastic prospect, but Peter feels this will need to start by 2020, especially as there is little or no prospect of any serious reduction in CO₂ emissions. He points out that the Paris Agreement will still leave us with a warming of at least 2.7°C even if all national commitments are honoured, which is vanishingly improbable. There are no plans for immediate action, 'and no date set for achieving carbon balance except between 2050 and 2100', when current politicians will either be retired or dead.

In his last chapter, A Call to Arms, Peter states that it is not enough to reduce carbon emissions, hence the need to remove dioxide from the atmosphere. Interestingly, he quotes a speech by Margaret Thatcher to the UN in 1989, for which he provided the text - even then, he was warning of runaway climate change through feedback amplification. As readers will be aware, the political situation is further complicated by well funded institutes denying global warming and attacking leading scientists like James Hansen. In the UK, Nigel Lawson's Global Warming Policy Foundation plays a leading public role, and Peter Lilley called Peter a 'well-known alarmist' after he himself had published a report funded by the above foundation recommending no action on climate change and ignoring the Stern review. Although there are small actions that we can take as individuals, I was persuaded by Peter's analysis that we should all be vocally supporting his proposed new Manhattan Project to undertake a colossal scientific and technical research programme on clean energy as well as technologies for carbon dioxide removal. As a citizen of planet Earth, this book is compulsory reading.

■ The Courage to Hope

David Lorimer

■ A WORLD BEYOND GLOBAL DISORDER

Edited by Fred Dallmayr and Edward Demenchonok

Cambridge Scholars 2017, 316 pp., £52.99, h/b – ISBN 978-1-4438-9882-9

The title of this remarkable collection of essays gives the lie to the oft heard phrase ‘New World Order’ which is in fact a form of disorder based on militarism and unipolar global hegemony on the part of the United States, even if this is now being challenged by China and a resurgent Russia. In June 1963, President Kennedy gave a commencement address at the American University where he stated that war need not be inevitable and questioned the routine demonisation of enemies. More remarkably, in answer to his rhetorical question about what kind of peace he sought, he replied: ‘not a Pax Americana, enforced on the world by American weapons of war; not the peace of the grave or the security of the slave. I’m talking about a genuine peace: the kind of peace that makes life on earth worth living; the kind that enables men and nations to grow and to hope and build a better life for their children; not merely peace for Americans, but peace for all men and women; not merely peace in our time, peace in all time.’ One can’t help thinking that Kennedy’s assassination might in some way have been linked to these sentiments, especially given the military and foreign policy record of the US since that time. [See my review of *The Paradox of our National Security System* in Books in Brief below.]

The speech is quoted in a powerful contribution by former Congresswoman Cynthia McKinney. Former because of her passion for truth, justice and peace. She was taught to be unruly by her father, and in Congress was part of every hot button issue that came across her desk. Because she tried to align her values with her behaviour, her talk with her walk, she became more than an irritant, she became dangerous, with a powerful array of status quo opponents. Here she advocates not war leadership, but peace leadership, like former Congressman Dennis Kucinich. She quotes Stéphane Hessel’s line “Indignez-vous!” - We should be indignant and outraged about the shambles that is happening in the world – disorder by design. Hence her recommendation that it is time for us collaboratively to interpose our vision and our directed action onto the warmonger’s plans. ‘We need to give them more resistance than they are getting from us now.’ And engage not in a clash, but in a dialogue of civilisations.

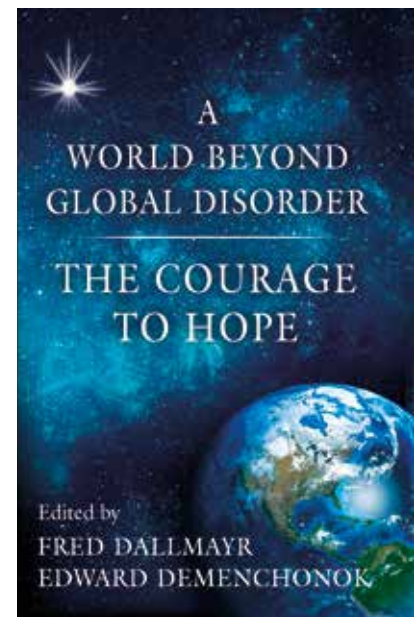
The subtitle of ‘The Courage to Hope’ reflects the title of a book by theologian Paul Tillich ‘The Courage to Be’. In this case, hope is not an escape, but an existential position, the courage to hope in an apparently hopeless world, genuine rather than foolish hope. Hope may require patience and needs to be embodied in acts of love and compassion.

The book itself is located at the crossroads of hopelessness and hope - on the one hand with a full awareness of the grimness of our global situation, not only military, but also environmental, and on the other a determination to work for a better and more cosmopolitan future. The contributions come from a variety of disciplines and cultural backgrounds, including China, with an essay on spiritual humanism and another on Muslim ethics in an era of globalism. Then the longest and final essay is by Demenchonok entitled ‘World in Transition: From a Hegemonic Disorder toward a Cosmopolitan Order’.

The first essay by Richard Falk on a new geopolitical realism for the 21st-century is a masterpiece of brevity and insight. He rightly contends that ‘a state-centric world order has shown its inability to find sustainable solutions to nuclear weapons and climate change at the global end of the spectrum and address severe and prolonged situations of criminal injustice in Syria, Palestine etc.’ Nation states are incapable of responding to global challenges, and global solidarity is helpless against preventing genocidal violence and crimes against humanity. The old geopolitical realism is still based on hard military power where law, morality and people are fundamentally irrelevant. The current global political leadership still treats this old geopolitical realism as the basis for rational behaviour, but this is manifestly inadequate with its focus on narrow national interest rather than planetary responsibility. Falk sketches the outline of a new geopolitical realism where war and militarism can no longer generate security and stability in an era when species vulnerability has become the signature reality. Structural reforms must be brought about so that global and human interests become primary. Then the development of political will to regulate the world economy on the basis of the values of justice, sustainability, self-determination, and ethical and ecological consciousness.

A telling example of global disorder is addressed in an essay on the use of drones as a means of random, extrajudicial killing of suspects. Daniele Archibugi focuses on three major problems: the status and rights of the target, the authority for the killings - decisions are often made by intelligence agencies or unaccountable bureaucratic bodies - and ‘collateral damage’ aka killing of innocent people. I agree with the author that these killings are war crimes fuelled by amoral power, and also that they represent the triumph of technology over humanity. It is very clear that this whole area needs international regulation, ultimately with a view to banning drone killings. In addition, such technology could easily get out of hand and be used by terrorist groups.

Edward Demenchonok articulates a cosmopolitan ideal as a realistic alternative to the current militarised and unipolar global hegemony. Cosmopolitanism would free the world from any hegemonic domination and the idea goes back at least as far as essays by Kant in 1784 and 1795. The cosmopolitan



ideal is an alternative to a conflicted state-centric international system, which needs fundamental restructuring to remove the privileges of the Security Council and create a consensus of all nations as free and equal under the rule of law. This is necessarily pluralistic and morally excludes violence and domination. The urgent task is to develop viable alternatives to hegemonic domination. The author outlines the distinctive characteristics of a New Cosmopolitanism based on diversity, democratic principles, ethics, dialogue and transformation. There is also huge work to be done to articulate and embody these ideals, but this essay, and the book as a whole, makes a very constructive point of departure. Demenchonok warns that a cosmopolitan order will not come about automatically – ‘all the great democratic achievements have been the result of people’s struggles for their legitimate interests.’ However, in this context, the cosmopolitan ideal can become a guiding and mobilising force that will only come about from the grassroots, as our current political leaders are hostages to short-term political and financial interests. And although the need for positive transformation has never been so urgent, the task has never been so difficult, so it is important to raise awareness as a preliminary to more coordinated action.

■ ‘Politics is Fate’

David Lorimer

■ DEFIANT EARTH

Clive Hamilton

Polity Press, 2017, 184 pp., £14.99, p/b – ISBN 978-1-50951-975-0

The author of this important book is Professor of Public Ethics at Charles Sturt University in Australia and author of *Requiem for a Species* about how and why we resist the truth about climate change. Subtitled ‘the fate of humans in the Anthropocene’, this book spells out the implications of this new geological epoch defined by the new discipline of Earth



Systems Science and which acknowledges humans as a geological force. Progressive thought in the humanities has been trying to cut humans down to size, but Hamilton shows that our freedom and power nevertheless confer great responsibility.

The first chapter spells out that this new geological era is a real rupture with the past that has created a convergence of human and geological history as a result of the impact of human activity on the Earth System as a whole. Hamilton argues that this represents an ontological shift in human self-understanding. Paradoxically and despite our technological power, we have become more vulnerable as climate becomes less predictable and controllable. The upward trend recorded by the insurance industry is a significant indication of this. Humans are both separate from and embedded in nature, and the history of modern science has been one of masculine striving for control and domination. Correspondingly, we do have freedom, but are also subject to necessity in terms of natural laws. Hence, the use of our freedom is a central issue, both collectively and individually.

The title of this review comes from a remark made by Napoleon to Goethe. Hamilton contrasts the attitudes deriving from Bacon and Goethe respectively. Bacon referred to science mastering and subjecting nature, which has been a driving force ever since and is embodied in the eco-modernist approach that greets the new era as a sign of our ability to renovate and control nature. A statement from the Breakthrough Institute claims that 'humans appear fully capable of continuing to support the burgeoning population by engineering and transforming the planet' (p. 63) A paradigmatic example would be solar geo-engineering aimed at controlling the global climate system and regulating the

amount of sunlight through solar radiation management. For Hamilton, this is a 'last-ditch attempt by eco-modernists to impose order, to exercise mastery, to regulate the planet as a whole in the interests of humans. (p. 72) He further notes, correctly, that this technology carries the implicit promise of protecting the prevailing politico-economic system and sidestepping the necessity for fundamental change or a 'socio-fix'.

By contrast, the narrative of Goethe's Faust illustrates overreach and hubris where human creativity is a gift that also tests our character in making sure that ethical progress keeps up with technological progress. If the development of Bacon's attitude represents the forces of neglect, against these are ranged the forces of care. The former embodies power-hunger, greed, growth fetishism, hedonism and psychological weaknesses, while the latter stands for self-restraint, respect for the natural world, love of one's children, and the desire for civilisation to flourish (p. 124). In other words, domination and exploitation versus living in harmony with nature. He sums the situation up masterfully on page 135, where he lists the forces on the side of responsibility and care, including scientific insights into the Earth's physical limits, evidence of ecological disruption, the logic of long-term self-interest and the political power of environmentalism. Against this is ranged an economic structure driven by the profit motive, the enormous political power of corporate interests, the seemingly insatiable demand for material affluence, along with 'human weaknesses of wilful ignorance, apathy, evasion and denial.' The Anthropocene meets globalisation, the World Economic Forum meets the World Social Forum, freedom meets power and responsibility.

Hamilton makes a clear distinction between anthropocentrism as a scientific fact and a normative claim: we now inhabit the Earth System driven by interconnected cycles and forces, where human activity modifies many of the processes and has - perhaps irreversibly - disrupted some of these, which means that we cannot revert to the Holocene. Oceans are one third more acidic, while humans represent 30% of animal biomass on the planet, domestic animals 67%, and other wild animals only 3% - a figure I found quite shocking. Our collective power is very considerable, even if we feel disempowered at an individual level. However, encouragingly and in spite of the fact that the measures were inadequate - see my review of Peter Wadhams' book - the tension between North and South shifted in the Paris Climate Summit of 2015 to a rhetoric that humankind must act as a whole in response to the question: how can we all live together on this Earth?

In spite of denials and resistance, we can no longer avoid planetary responsibility, especially given that we are now more aware than ever of our impact on the

Earth in the present, and by implication in the future. Curiously, in this respect the book makes no mention of population, which is not even in the index. This is manifestly a key impact in addition to rising consumption and requires the empowerment of women, especially in Africa. The most significant overall contribution of this book is the call for a different kind of orientation to the Earth, 'one in which we understand deeply our extraordinary power and unique responsibility.' (p. 152) The forces of neglect represent business as usual, a form of wanton neglect as both reckless and self-indulgent, and this is the default momentum unless sufficient resistance is engendered. This is where politics is unavoidably central, but awareness and outrage provide the fuel for action, otherwise we just remain passive passengers and betray the future of our children. Hence the pressing need for more people to become activists and bring together the forces of care. This book articulates why this has become urgent and necessary.

GENERAL

■ Language is Us – and Us Alone

Lance Butler

■ WHY ONLY US: LANGUAGE AND EVOLUTION

Robert C. Berwick and Noam Chomsky
MIT Press, 2016, 224 pp, £15.95, p/b – ISBN 978-0-262-03424-1

This is not a book for the faint-hearted and, unless there has been some serious brightening-up in recent years, readers able to understand its every paragraph will be very few in number.

Berwick and Chomsky (yes, I was surprised too, for this is the very Chomsky who rose to controversial prominence sixty years ago and is now nearing ninety) want to report on where we are now in the vexed matter of when, how and why language evolved biologically. I think that they could have done it more clearly for the general public, but in the event they have chosen to speak to fellow-researchers in their discipline. For this reason they take no prisoners and often seem happy to exclude the rest of us. Their book is awash with the special terms of their many disciplines, many of them unexplained, and the sense of being excluded from a small esoteric club is constantly being sharpened as we read. Take this sentence as a sample:

Very, very little systematic abstraction-layer circuit design knowledge, from dataflow architectures, to pipelined CPU designs, to asynchronous processing, has yet to make its way into cognitive modelling practice. (p. 133)

All perfectly true no doubt, but how many readers will know what each and every one of these monsters actually is? The contrast between the rhetorical flourish at the start of the sentence (the repetition of 'very') and the brain-freezing specialist register of the rest of it is a tiny glimmer of amusing light discernible among these opacities. And there are pages and pages like this.

However, leaving the problems posed by this highly-academic register aside, one is able to discern something very useful here. Thus: we know that language evolved at some point and we know that language has been a *sine qua non* of human development ever since, but there are problems: how could so complex a feature of being human have developed in the very short evolutionary time-span available for it? Was there no language among hominid populations? Among Neanderthals? Is there any real language among primates such as chimpanzees? To quote the title of this book: *Why Only Us?* (I don't know why the publishers have omitted the question-mark from this obviously-interrogative implied clause.) Is there a gene for language? What is it about the development of the brain of *Homo sapiens* that permitted language to emerge?

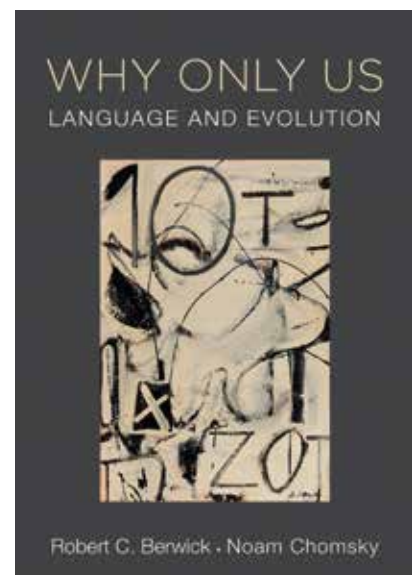
I could not possibly rehearse the compacted, even clotted, arguments that sustain Berwick and Chomsky's answers to these questions, but it does seem that they have done the work for us by reviewing and assessing all the relevant research and scholarship in the area. They leap polymathically from biology to game theory to linguistics to anthropology and philosophy in the most impressive manner and even if we cannot follow them we can perhaps believe that they know what they are talking about after what amounts to a *century* of thought and work, which is what they have amassed between them.

Here are some of their answers, as they present them, opaquely for we outsiders but tentatively and modestly it has to be admitted.

1. Human language is very special. Songbirds and chimpanzees do not really have 'language' in our advanced sense of the term. The term 'language' is simply not suitable to describe the abilities of even the best-educated ape.
2. There was no real 'protolanguage' among hominids and Neanderthals. They may have done the communicating of animals (roaring, birdsong, mating calls) but they show no signs of a second-degree consciousness of language such as we find among early men in cave-paintings and the like.
3. This is because real human language is NOT a matter of simple 'communication' as is assumed by most biologists. Nor is language *referential*: it doesn't simply indicate pre-established entities within the world but rather creates the world we inhabit.

4. Instead of these external orientations language evolved as an *internal* matter, an 'internal mental tool', a way of organising the new *thoughts* being experienced by early man. Language does a great deal more than merely communicate, notably in internal spheres such as planning, calculating, daydreaming and poetry.
5. 'Externalisation' – that is speaking and writing – come second to this internal process and may not even be a necessary consequence of it.
6. Language evolved NOT in a slow, gradual, pure-Darwinian way but very quickly, probably as a result of some minor mutation in the brain that pulled various of its capacities together.
7. Subsequent language *development* is another matter entirely and is not 'evolution' as such. The history of language from the beginning is inexorably dependent on that first mutation, that chance concatenation of circumstances in the brain. Since then nothing much has changed in the Basic Property of the brains of language-users. A Martian might easily see all the planet's languages as dialects emerging from this same basic ability. Little or no actual biological evolution has occurred in our linguistic abilities since they came to us.
8. Real language arrived on the scene about 80,000 years ago, before the exodus from Africa and the diaspora of *Homo sapiens* across the world which took place about 60,000 years ago. As a result of this point and the preceding one we may conclude that we all belong to the same family, *Hom sap*, in the sense that we all have the Basic Property that makes language possible – aboriginal Australians, Africans, Chinese, Amerindians and Caucasians alike.

All these ideas have come forward in recent decades because of advances in the study of the brain and in the study of fossil and other records and, of course, because of work in linguistics. In spite of its dense and at time rebarbative nature I found myself surprisingly inspired by this book once I had waded through it. First because, in spite of its high and exclusive professionalism, it shows the very best of interdisciplinary thinking at work: perhaps only great brains like the brains of these two authors, along with that of Steven Pinker say, could have put together biology, anthropology, linguistics and many other considerations to come up with an authoritative synthesis. Not only do they remind biologists, for instance, that they need to keep up with advances in linguistics before pronouncing on the evolution of language, they remind all of us that a monocular approach to matters human is almost bound to miss something important or simply fail to understand what is going on.



Second and following from this, it is wonderful to feel some of the great currents of modern thought coming together. Berwick and Chomsky are happy to quote Saussure though they come from a very different school, and they sound like Derridians in their description of how language formed the world of early man and how it forms our later world too in just the same way. Great minds think alike, as they say.

Thirdly and finally, my feeling of inspiration after reading this book is based on its provision of something scientific and palpable to hold on to in our endless political arguments: I am not an obsessive egalitarian but it is very nice to learn that at a deep level all humans are the same because they all have the same real language capacity. Language is so much the heart and soul of everything we do as humans that this easily trumps a large number of more superficial differences.

Lance Butler worked in the English Departments of the University of Stirling and the University of Pau for forty-five years and has now retired to Perthshire where he is working on a book on Etymology.

■ The Discovery of a Gene Design Machine

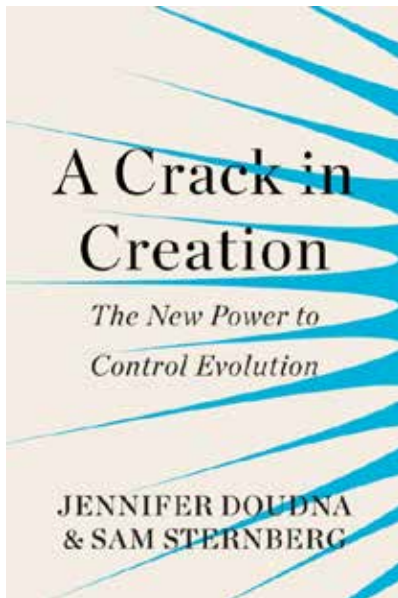
Janine Edge

■ A CRACK IN CREATION – THE NEW POWER TO CONTROL EVOLUTION

Jennifer Doudna & Samuel Sternberg

The Bodley Head, 2017, 285 pp., £9 p/b
- ISBN 978-1-84792-381-3

The spectacular advance in gene editing technology (known as 'CRISPR') has recently attracted significant attention in the media and this book is on how it came about. I consider it a must read, not least because of the huge implications for our environment



and society. The cover calls it 'potentially the most powerful and dangerous' of all human discoveries and this may be no exaggeration.

It is also of interest to those looking beyond the technical science. First it shows how CRISPR occurs in nature and there is an intriguing story at the beginning about a spontaneous healing of a genetic disease. Secondly Professor Doudna, the main pioneer of the CRISPR technology, writes the book in the first person and we are taken on her personal journey complete with her dreams and emotions. Lastly Doudna is a scientist who has decided to engage fully in the moral, ethical and even spiritual implications of her discovery, even asking questions such as - 'Will we be transgressing divine laws if we use this technology?'

The book divides into two halves. The first part, entitled 'The Tool', is a detailed description of how the CRISPR gene editing technology was discovered and works. Doudna starts from first principles on what is a genome, chromosome, gene and DNA, and how genetic information is passed from DNA to RNA (produced from the DNA template) to protein. It quickly progresses to an in-depth account of a naturally occurring process in which bacteria acquire immunity to viruses. CRISPR stands for 'clustered regularly

interspaced short palindromic repeats' found in bacteria which were discovered to be strands of identical DNA taken from a virus which previously infected the bacteria. When the virus strikes the bacteria again, the CRISPR generate RNA strands from the stored DNA and combine each one with a protein called Cas 9. The RNA acts like a guide taking the protein to the offending DNA sequence in the virus and the Cas9 acts like a weapon to snip that sequence out. The virus is thus disabled.

In June 2012 the CRISPR discovery was published by Doudna and others together with a suggestion that this natural process could be harnessed for genome editing. The next 5 years saw an explosion research all round the world which involved combining RNA with the Cas-9 protein to enable a genome to be edited almost like a piece of text, including adding in strands of DNA. This has shown the potential use of the CRISPR technology to treat genetic diseases (sickle cell anaemia, cystic fibrosis and muscular dystrophy to mention just three), lower the risk of or cure many other conditions and to edit virtually any gene in any cell, plant or animal, for any purpose. This includes germline cells which, when so edited, have the potential to continue for all future generations.

The second part of the book is entitled 'The Task' and is about the enormous implications of CRISPR and how Doudna has personally orientated her life from scientist to international coordinator of the effort to agree a way to contain the use of the CRISPR technology. This is no easy task. Only one month after Doudna and her colleagues published as article asking scientists to refrain from human germline cell editing, an article was published in April 2015 describing experiments carried out in a Chinese university to edit the beta-globin gene in 86 human embryos, with a view to preventing the genetic blood disorder known as beta-thalassaemia. The ethical issues are not straight forward. If this technology is available, when could it be right to use it?

On this point, it is interesting to learn that apparently every person experiences roughly one million DNA mutations throughout the body per second. Which leads back to the story about the spontaneous healing at the beginning of the book. It concerns a woman

with WHIM syndrome which is a potentially deadly immunodeficiency disease caused by a single incorrect letter among some six billion total letters of DNA. The patient found herself suddenly cured at the age of 38. It transpired that a stem cell in her blood (from which all other blood cells in her body originated) had undergone a spontaneous shattering to the chromosome which harboured the mutated gene. This particular case was highly unusual but apparently scientific literature is peppered with cases of genetic diseases being cured through spontaneous editing of a genome. CRISPR technology enables this to be done on purpose – and for the benefit of many, it could be argued.

So how is CRISPR different from previous genetic tinkering such as Dolly the sheep cloning, gene splicing and test tube babies? The answer is CRIPR is much, much more accurate, quick to carry out, cheap and relatively easy. Even undergraduate biology students are using it, as shown in a TED talk given by Doudna which can be found on YouTube. The ease of use of CRISPR has led to some alarming (for me) experiments, including altering the DNA of an African elephant to make it more like a woolly mammoth and humanising the DNA of pigs to make their organs more suitable for human organ transplants. The knowledge needed to use the CRISPR technology is now widely available.

So what are the risks? If it goes wrong it could play havoc with our environment, not to mention the evolution of the human species, even if used in good faith. It is almost impossible to predict the unforeseen circumstances. And what if it is used for nefarious purposes - genetic terrorism and eugenics to name but two? On the plus side it could, for example, aid food production in a rapidly changing climate, eradicate horrific hereditary conditions, cure other diseases and modify the genes of mosquitoes so they can no longer carry malaria. So it seems we all need to know and participate in discussions about the CRISPR technology - which is what, more than anything else, Doudna advocates in her book.

Janine Edge is Chair of the Network Trustees and works as a legal mediator.

