TRINH THUAN AND THE INTERSECTION OF SCIENCE AND BUDDHISM

by Amos Yong

Abstract. Trinh Thuan, professor of astronomy at the University of Virginia, Charlottesville, since 1976, has published a number of books over the years that have touched on topics in the science-and-religion discussion. This essay reviews these volumes in light of a recent book he coauthored with Matthieu Ricard, a monk in the Tibetan Mahayana tradition with previous background and training in the biological sciences. The shift is observed in Thuan's views from at one point being attracted to a form of theism based on inferences drawn from the anthropic principle to later being intrigued by Ricard's explanations of the cosmos based on Buddhist consciousness theories. Thuan's journey as a scientist seeking further understanding is a lesson to the religion-and-science dialogue that more of the world's religious traditions need to be engaged with their specificities so that what emerges is an expanded conversation.

Keywords: anthropic principle; astrophysical cosmology; beauty; Buddhism and science

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The Secret Melody: And Man Created the Universe. By Trinh Xuan Thuan. Trans. Storm Dunlop. Paris: Librairie Arthème Fayard, 1991. English trans. by Storm Dunlop. Oxford: Oxford Univ. Press, 1995. Reprint, Philadelphia and London: Templeton Foundation Press, 2005. xix + 313 pages. Paper. $22.95.

Chaos and Harmony: Perspectives on the Scientific Revolutions of the Twentieth Century. By Trinh Xuan Thuan. Paris: Librairie Arthème Fayard, 2000. English trans. by Axel Reisinger. Oxford: Oxford Univ. Press, 2001. Reprint, Philadelphia and London: Templeton Foundation Press, 2006. xiii + 366 pages. Paper. $22.05.

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The Quantum and the Lotus: A Journey to the Frontiers Where Science and Buddhism Meet. By Trinh Xuan Thuan and Matthieu Ricard. Paris: NiL/Fayard, 2000. English trans. by Ian Monk. New York: Crown, 2001. Reprint, New York: Three Rivers Press, 2004. viii + 312 pages. Paper. $14.95.

Trinh Xuan Thuan has been professor of astronomy at the University of Virginia, Charlottesville, since 1976. Born in Hanoi, Vietnam, to a Buddhist family in 1948, Thuan's studies took him first to France, where he studied physics, and then to the California Institute of Technology, the Mecca of astrophysical research. He has since focused on the formation of young dwarf galaxies and has coedited a number of technical volumes in this area (Kunth, Thuan, and Van 1987; Thuan, Montmerle, and Van 1987; Mamon, Thuân, and Vân 1997). *The Secret Melody* and *Chaos and Harmony* were both published in French, written while on sabbatical leave at the Institut d'Astrophysique in Paris and the University of Paris respectively. While also originally published in French, *The Quantum and the Lotus* is the product of a dialogue between Thuan and Matthieu Ricard, a Nobel prize–winning scientist trained in cellular genetics who left the laboratory to pursue life as a Buddhist monk in Nepal.[1] They met at an academic conference in 1997, struck up a conversation that was then extended in writing, and ended up publishing their exchanges. Thuan's work will be of interest to *Zygon* readers especially if his earlier work is reread from the perspective opened up by the dialogue documented in *The Quantum and the Lotus*.

The Secret Melody and *Chaos and Harmony* are significant contributions to science writing aimed for a broad audience. Recalling that these books were originally published in French, then translated into English, and later reprinted by the Templeton Foundation Press, we get a sense both that Thuan has a gift of communicating difficult scientific concepts and ideas to a wider audience and that what he has to say is pertinent and of interest to lay audiences on both sides of the Atlantic. At one level, then, these two books can be read as state-of-the-question reports from the perspective of one trained in the astrophysical sciences.

What exactly is Thuan reporting on in these two volumes? *The Secret Melody* consists of nine chapters. The first, "Past Universes," surveys the (early) history of human and (later) scientific thinking about the nature, form, shape, and structure of the world. This sets the reader up for Thuan's secondary hypothesis, announced in the subtitle of this book—*And Man Created the Universe*—that the history of scientific understandings of the world has undergone various shifts and even revolutions as human beings have learned how to continuously reimagine the universe over time. In chapter 2, Thuan suggests that it has been in large part shifts in our understanding of the nature of light that have transformed our world- or uni-

verse-view, particularly in terms of our increasing knowledge of our place in the solar system, amidst the Milky Way, and (now) among the hundreds of billions of other galaxies in the universe.

Chapters 3 through 6 provide some details of "how the world works." Thuan leads his readers in an intergalactic journey toward the distant past and the origins of the world in the Big Bang and through the early moments when matter "overcame" antimatter and helium and hydrogen particles emerged. At the time of writing (1991), predicting the ultimate fate of the universe seemed to depend on identifying its density. If the density (mass divided by volume) was less than three hydrogen atoms per cubic meter, the universe would expand indefinitely, in which case it eventually would whimper out in a "cold death"; if more, the universe would be destined at some point to collapse back on itself, in which case it would go out in a blazing inferno that can be imagined as the Big Bang in reverse (a Big Crunch). (In the Preface to the 2005 English edition Thuan suggests that scientific findings since 1991 seem to support the former rather than the latter.) Throughout these more descriptive chapters, Thuan opens up the "secrets" of the universe, brilliantly describing the mechanisms that have made the world tick and have driven its evolutionary developments. He covers a lot of scientific ground but does so carefully, patiently, and accessibly so as to leave few readers behind.

The last three chapters of *The Secret Melody* may be of most interest to readers of *Zygon*. Here Thuan takes up the questions about whether or not the universe is accidental or necessary, whether or not we can or need to talk about a first cause "behind" the Big Bang and if such a first cause might be what monotheists call God, and whether or not there are other serious alternatives to Big Bang cosmology. Thuan notes that ours is a "very precisely adjusted universe" (pp. 230–32), to the point that what some have called the anthropic principle—the idea that the universe has been hospitable toward the appearance of consciousness in general and human consciousness in particular—cannot be dismissed out of hand. At this point we are left with two options: (1) to hold with Jacques Monod and others that consciousness arose through chance or fortuitous evolutionary events, with one version of this position speculating about there being innumerable parallel (but disconnected) universes (multiverses) so that ours is not one designed for consciousness but is rather the luck of the dice, which were not rolled for the overwhelming majority of other worlds, or (2) to adopt some version of the anthropic principle that holds that the universe's finely tuned constants made it hospitable for the emergence of consciousness. Thuan is sensitive to the many variables that need to be considered in any attempt to adjudicate the first question, but he finds himself led to a Pascalian type of wager. Because of the fundamental universal constants and physical laws, because the parallel-universes idea seems to undermine the human experience of freedom (since in the other parallel

worlds alternative "options" are actualized instead), and because Monod's position (along with that of Stephen Jay Gould and others) seems to lead to despair instead of hope, Thuan concludes: "For myself, I am prepared to bet on the existence of a supreme being" (p. 249).

In his conclusion, Thuan entertains objections to the triumph of the Big Bang cosmology but suggests that detractors will have to provide alternative explanations for the red shift of light of the galaxies (which indicates that they are moving away from us) and for the 3K cosmic background radiation that bathes the entire universe (which supports the high temperatures of the early universe predicted by the Big Bang theory). At the same time, in keeping with the primary thesis suggested in the book's title, Thuan is also convinced that Big Bang cosmology is not immune from clarification, even to the point that a new picture of the world and its origins might eventually emerge. The universe's "secret melody," in other words, "will remain forever inaccessible" (p. 274), even if we come upon various notes and harmonies that might be played.

Chaos and Harmony continues the composition begun in the earlier book, but with different foci. The seven chapters of this volume are intended to explore twentieth-century developments especially in the cosmological, astrophysical, and quantum mechanical sciences as seen specifically through the lens of beauty (aesthetics). By *beauty* Thuan means theoretical formulations characterized by inevitability (in terms of conclusions to which we are irrevocably drawn), simplicity (in terms of requiring a minimal number of hypotheses), and coherence (in terms of harmonizing larger and larger realms of knowledge).

In the body of this volume Thuan argues for the beauty of the following scientific revolutions or ideas:

- the cosmological sciences, especially regarding the evolution of the universe at every level—from the formation of galaxies to that of stars to that of our solar system to that of the earth and its moon and so on—as having proceeded according to predetermined constraints and yet involving completely fortuitous, contingent, and unpredictable accidents (chap. 2);
- the science of chaos, which reveals nature as exhibiting regularity amid irregularity, being deterministic but still unpredictable because of our incapacity to identify with precision the initial conditions of nonlinear dynamical systems (chap. 3);
- the principles of symmetry and their instantiation in such things as snowflakes, physical laws, and the theory of relativity but their being broken in such things as the ultimate singularity, the triumph of matter over antimatter, the second law of thermodynamics, and the phenomenon of black holes (chap. 4);

- quantum mechanics, where indeterminism predominates and observers influence if not create realities but also where theories of unification have the best, if any, chance of succeeding in providing a "theory of everything" (chap. 5);
- the evolutionary and especially biological sciences, which develop apparently according to random processes but also seem to exhibit teleological features (chap. 6).

Throughout these discussions, readers follow the interstellar, intergalactic, inner-atomic and inner-quantum experiences of two fictitious characters as they race through the micro- and macro-universe at varying speeds, including that approaching the speed of light.

The end of *Chaos and Harmony* returns to some of the questions raised in the previous volume but does so informed by the conviction regarding what Thuan calls "the unreasonable effectiveness of thought" (the chapter title). Why is the universe intelligible, even if such intelligibility cannot finally be exhaustively grasped? Does mathematics exist independently of the human minds that formulate its equations? Are physical laws discovered or invented? Regarding these and other like questions, Thuan again resists the idea that the universe is the result of propitious chance. On the contrary, adopting a Platonic approach to mathematics, he argues toward the idea that there is a fit between human reason and the way the world is because such "was 'programmed' in advance . . . , that the human brain was itself engineered with meticulous precision, just for thought to emerge" (p. 321). Hence Thuan is comfortable talking about "a contingent world and a necessary God" (pp. 331–32) even if he does not equate such a Primary Cause with any of the monotheistic faith traditions' understandings of that God.

Although there is some overlap between *The Secret Melody* and *Chaos and Harmony*, on these and other matters there also are distinctive features, conceptual structures, and intended objectives. The former's emphasis is on more "big picture" issues, driven by cosmological and astrophysical data, while the latter's focus is more the major scientific revolutions in the twentieth century as viewed through the idea of beauty (that is, inevitability, simplicity, and coherence).

Thuan's intellectual journey takes some interesting twists and turns in and through his dialogue with Ricard in *The Quantum and the Lotus.* There is an introduction, fifteen thematic chapters, and two separate conclusions from the monk (Ricard) and the scientist (Thuan). The discussion ranges widely across scientific and metaphysical issues including the question of design, quantum physics, time, chaos, consciousness, beauty, and many other topics. In terms of scientific content, Thuan does not present anything new here that is not to be found in the other two books, even as *The Quantum and the Lotus* is just as accessible to educated lay audiences.

What is new is that, because the volume is set up as a dialogue between a scientist and a Buddhist monk, the issues negotiated throughout produce, whether intended or not, a contemporary scientific apologetic for Buddhism, especially of the Tibetan Mahayana version practiced by Ricard. It is interesting, of course, that both Thuan and Ricard reject a materialistic interpretation of the world. But, whereas Thuan had before admitted an openness to thinking about the First Cause in theistic terms (as vague as such were), Ricard, a practicing monk who has served as the official French translator for the Dalai Lama, opts instead for a nontheistic view of consciousness in relationship to an evolutionary universe. At one level, this book can be understood as documenting Thuan's own reencounter with the Buddhism of his youth and his attempts to explore the compatibility of the scientific worldview at the turn of the twenty-first century with contemporary retrievals and reappropriations of the Buddhist tradition.[2]

If read in this light, the rhetorical shifts in Thuan's metaphysical speculations are noteworthy. In contrast to the much more explicit theistic language at the end of *Chaos and Harmony*, Thuan's language in *The Quantum and the Lotus* is tempered in the direction of Benedict Spinoza and Albert Einstein. Now, realize that the original editions of both volumes appeared at about the same time, in the year 2000. Even if Thuan does not deny the fine-tuned initial conditions and physical constraints, he does clearly state in *The Quantum and the Lotus*, "I do not personally believe in a personified God, but rather in a pantheistic principle that is omnipresent in nature" (p. 50). At the same time, Thuan also suggests that such a principle of organization did produce laws of nature that have taken on most if not all of the traditional attributes of the personal God of monotheistic traditions: universality, absoluteness, timelessness, and omnipotence (in terms of being all-effecting). Ricard's Buddhist perspectives lead him to explain the laws of nature, along with the finely tuned constants, as simply reflecting the interdependence of nature's phenomena. But Thuan insists that such a principle of organization is, if not personal, nevertheless intentional in terms of creating a world with conscious and intelligent observers such as ourselves.

Is there a stalemate in the discussion between Thuan and Ricard? I do not think so. True to the Buddhist privileging of consciousness, Ricard presumes a beginningless succession of moments of consciousness so that "the universe and consciousness have always coexisted" (p. 42). But could not such a notion of universal consciousness be compatible with Thuan's universal creative principle? To be sure, the primordial cosmic consciousness in Ricard's Buddhist scheme of things is certainly not personal, omnipotent, or creator out of nothing, and there is the further assumption regarding some kind of cosmic dualism—the universe and consciousness—in the Buddhist tradition. Nevertheless, does not this cosmic consciousness parallel a number of philosophical notions that have played roles in

Christian theology, whether that be the Platonic *nous*, Hegel's *geist*, or the mental pole of Whitehead's process philosophy? If so, might this serve as a springboard for Christian-Buddhist dialogue on creation and the origins of the world (as seen, for example, in Schmidt-Leukel 2006)? Of course, Buddhism and monotheistic traditions may still be finally incompatible, but only for those who insist on a personalistic view of consciousness or the creative principle.

There are many other reasons to read *The Quantum and the Lotus* besides those that animate my review of the book. For one, the actual give-and-take characterizing the interchange between the scientist and the monk exudes a palpable sense of the intellectual jostling that occurs at the frontiers where science meets the world's religions in general and the Eastern or Buddhist traditions in particular. There is also the already mentioned apologetic value for Buddhism. As impressive along these lines is that Ricard's compatibilistic understanding of Buddhism and modern science is deeply informed by the meditative practices of the Tibetan tradition. For Ricard, the question of spiritual practice and even soteriology, if such can be generalized from the Christian to the Buddhist tradition, is not abstracted when discussing issues in the current encounter between religion and science from the Buddhist perspective.

In the end, I am convinced that the religion-and-science dialogue has to be enlarged so as to become the Christianity-Buddhism-science trialogue (or the Christianity-Islam-science trialogue, etc.). Most religious people are not religious "in general" but are Christians, Buddhists, Muslims, and so on, and the religiously specific individuals engaging in the religion-and-science conversation can benefit from observing and listening to people of other religious traditions engage that same conversation. And certainly scientists on all fronts can benefit from observing and listening to people of various faiths bring their wisdom traditions to bear on issues under negotiation in the science-and-religion arena. For all of these reasons and more, the work of Trinh Xuan Thuan (and Matthieu Ricard) deserves to be read.

NOTES

1. Ricard has also published widely, early on in science, and more recently producing translations of Buddhist texts and writing on Buddhist practices and virtues.
2. In other, shorter, pieces Thuan has continued to explore matters at the intersection of science and Buddhism (for example, Thuan 2006a, b).

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