

AT THE CROSSROADS

Excerpts from first chapter of „*The Quantum and the Lotus. A Journey to the Frontiers where Science and Buddhism meet.*“

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Are there any grounds for a dialogue between science and Buddhism? To find out, we must first clarify the pursuits of each, and then explore whether Buddhism (and spirituality in general) can complement science in important ways, particularly concerning ethics, personal transformation, knowledge of ourselves, and genuine spiritual insight. Buddhism has always been interested in questions that are also basic to modern physics. Might science therefore also help Buddhism in its exploration of reality?

MATTHIEU: You've made an impressive journey from Vietnam to your life as an astrophysicist in the United States. What drew you into a life in science?

THUAN: The 1960s were a golden age for astrophysics, with many great discoveries being made, such as the detection of the cosmic background radiation, which is the residual heat from the Big Bang; the discovery of pulsars, which are stars made entirely of neutrons; and the identification of quasars, which are celestial objects in far distant space, near the edge of the universe, that emit an extraordinary amount of energy. When I arrived in the United States, satellite exploration of the solar system had gotten into full swing. I can still remember the wonder of watching the first images of the surface of Mars transmitted by the space probe Mariner on a screen in our classroom. Those pictures of a dry, sterile desert told humanity that there was no intelligent life on Mars.

The canals that nineteenth-century astronomers thought they'd seen turned out to be nothing but optical illusions created by sandstorms. In the midst of such intellectual ferment, I just had to become an astrophysicist. Ever since, I've continued to marvel at the wonders of the universe, observing it through state-of-the-art telescopes, all the while thinking about its nature, origin, evolution, and destiny.

What did you find unfulfilling about your scientific career? Leaving a biology lab in Paris for a Tibetan monastery in Nepal is an unusual move, to say the least.

MATTHIEU: It was a natural progression, a step in an increasingly thrilling exploration of the meaning of life. All I did was leap from one stone to the next, go from one valley into another, into ever more beautiful realms. I followed where my passions led, while trying not to waste a single moment of this priceless human existence. I was lucky enough to live for thirty years alongside some remarkable Buddhist masters. This was a simple, direct experience, but also so profound that I always find it difficult to describe. You can recognize human and spiritual perfection when you see it, but the usual words that come to mind—wisdom, knowledge, goodness, nobility, simplicity, rigor, integrity—just aren't enough.

I think what everyone should be doing, before it's too late, is committing themselves to what they really want to do with their lives. Scientific research was interesting, of course, but I felt as though I was just adding a tiny dot of color to a pointillist canvas without knowing what the final composition would be like. So was it worth giving up all the unique opportunities of a human existence for that? In Buddhism, on the other hand, the point of departure, the goal to be reached, the means to that end, and the obstacles in the way are all perfectly clear. All you have to do is to look into your own mind and see that it is so often dominated by egoism, and that egoism derives from a deep ignorance of the true nature of ourselves and of the world. This state of affairs inevitably makes us and others suffer.

Our most urgent task is to put a stop to this. The means to this end is to develop love and compassion, and to eradicate ignorance by following the path of enlightenment. As the days and years go by a tangible change takes place that creates a rare' joy, exempt from hope or fear, which has constantly nourished my enthusiasm.

T: So why this conversation with a scientist?

M: One of Buddhist philosophy's main tasks is to study the nature of reality, and science offers many compelling insights into the nature of our world.

T: My work constantly raises questions about reality, matter, time, and space. Whenever I come up against such concepts, I can't help wondering how Buddhism deals with them, and how the scientific view of reality corresponds to the idea of reality in Buddhism. Do these two points of view coincide, are they opposed, or do they simply have nothing in common? I haven't studied Buddhist texts, so I don't have the knowledge necessary to answer such questions.

M: Is there a solid reality behind appearances? What is the origin of the world of phenomena, the world that we see as "real" all around us? What is the relationship between the animate and the inanimate, between the subject and the object? Do time, space, and the laws of nature really exist? Buddhist philosophers have been studying these questions for the last 2,500 years. Buddhist literature abounds with logical treatises, theories of perception, analyses of different levels of the world of phenomena, and psychological treatises exploring aspects of consciousness and the ultimate nature of our minds.

T Are you saying that Buddhism is a science of the mind? Is it a Science in the same sense as a natural science - that is to say, based on observation, with mathematics as its language?

M: The authenticity of a science doesn't necessarily depend on physical measurements and complex equations. A hypothesis can be checked by inner experience in a rigorous way. The Buddhist method begins with analysis and then often uses "thought experiments," which are hypothetical experiments conducted in the mind, but which lead to irrefutable conclusions, even though the experiments cannot be physically carried out. This technique is widely used in science.

T: That's right. Thought experiments are extremely useful in physics in particular. Einstein and other great physicists have used them not only to demonstrate physical principles, but also to point out paradoxes in some physical situations. For example, when studying the nature of time and space, Einstein imagined himself astride a particle of light. When thinking about gravity, he saw himself in an elevator falling through a vacuum.

I understand that the questions explored by modern physics echo the investigations of Buddhism in unexpected ways. But why is Buddhism interested in modern science, and in particular in physics and astrophysics?

M: Of course, modern science isn't Buddhism's main preoccupation. But there is interest in the findings of science because Buddhism has long been asking similar questions. Can separate, indivisible particles be the "building blocks" of the world? Do they really exist, or are they just concepts that help us understand reality? Are the laws of physics immutable, and do they have an intrinsic existence, like Platonic ideals? While not exaggerating superficial similarities, a study of both the differ-

ences and points of agreement between science and Buddhism may help us to deepen our understanding of the world.

Buddhist research is, above all, based on insights perceived through direct life experience, and is not bound by rigid dogma. It is ready to accept any vision of reality that is perceived as authentic. One of its main goals is precisely to bridge the gap between the way things really are and the way they seem to be. The Buddha often put his disciples on their guard against the dangers of blind faith. He said, "Investigate the validity of my teachings as you would examine the purity of gold, rubbing it against a stone, hammering it, melting it. Do not accept my words simply out of respect for me. Accept them when you see that they are true."

But the simple accumulation of knowledge is not enough. My teacher Khyentse Rinpoche said, "If you amass intellectual learning just so that you will be influential and famous, your state of mind is no different from that of a beggar sponging off the rich. Such knowledge will bring no advantage either to yourself or to others. As the proverb goes: „Much knowledge, much pride.“ How can you be of help to others unless you subjugate the negative tendencies that are anchored in your very being? To think that you can is just a joke-like a penniless beggar inviting the whole village to a feast. There are many signs of success in the contemplative life. But the most important is that after a few months or years, your egoism has lessened and your altruism has increased. If attachments, hatred, pride, and jealousy still remain as strong as before, then you have wasted your time, gone down a blind alley and fooled other people. In contrast, knowledge of natural science allows us to influence the world, either constructively or negatively, while having relatively little effect on ourselves. It is obvious that since scientific knowledge has no connection with goodness or altruism, it cannot create moral values. So we need a contemplative science, in which the mind itself investigates the mind, in order to dispel the fundamental delusions that generate so much suffering for ourselves and others.

T: My understanding is that the Buddha's teaching was essentially practical. He said that our main objective in life should be to improve ourselves rather than worrying about the origin of the universe or the nature of matter.

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M: Another man asked the Buddha some questions about cosmology. In reply, he picked up a handful of leaves and asked, "Are there more leaves in my hands, or in the forest?" "There are more in the forest, of course," replied the man. The Buddha went on, "Well, the leaves in my hand represent the knowledge that leads to the end of suffering." In this way the Buddha showed that certain questions are superfluous. The world has limitless fields of study, as numerous as the leaves of the forest. But if what we want more than anything else is enlightenment, then it is better to concentrate entirely on that aim and gather together only the knowledge that is directly relevant to our quest.

But experience shows that it is necessary to understand correctly the nature of the exterior world and of the ego, or what we term "reality," if we want to eliminate ignorance. That is why the Buddha made this the central theme of his teaching. He also emphasized the difference between how we perceive phenomena and their true nature, as well as the evil effects of such confusion. Mistaking a rope for a snake in a dimly lighted forest causes ungrounded fear. But as soon as light is cast on the rope and its true nature is revealed, then fear fades away. Buddhist investigations show that the individual ego and the external phenomena of our world are not separated. The distinction between "self" and "others" is purely illusory. Buddhism calls the true state of reality "emptiness," or the absence of intrinsic existence. One of our greatest errors is to believe in a solid reality to what we perceive. This idea of a solid reality has dominated Western philosophical, religious, and scientific thought for over two thousand years.

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T: You make a point that raises an issue I have long found troubling about the world of science. As

you know, when I was nineteen I went to Cal Tech. There I rubbed shoulders with the greatest scientific minds, Nobel laureates and members of the National Academy of Sciences. I naively thought that their brilliance and creativity made them superior beings in terms of life in general and human relationships in particular. I was bitterly disappointed. You can be a great scientist, a genius in your field, and yet remain a dreadful person in daily life. This disparity shocked me. I think that Buddhism, or other forms of spirituality, might be able to complement science by filling in the areas where it falls short, particularly when it comes to ethics.

The history of science is full of examples of great scientists who were distinctly less inspiring when it came to their personal relationships. A striking example is Newton, who, with the possible exception of Einstein, was the greatest physicist ever. He behaved in a despotic manner toward his colleagues in the Royal Society of London, wrongly accused Leibniz of robbing him of the invention of the calculus (while both had invented it independently), and he treated his rival, John Flamsteed, the Astronomer Royal, in a terrible way. Even worse, the German physicists Philipp Lenard and Johannes Stark, who both won the Nobel prize for physics, enthusiastically backed the Nazis and their anti-Semitism by proclaiming the superiority of "German science" over "Jewish science."

Occasionally, but only too rarely, scientific genius and a keen sense of morals and ethics come together in a single person. This was the case for Einstein, whom Time magazine has named as the most remarkable personality of the twentieth century. During the First World War, Einstein fearlessly stood up to the Kaiser by signing an antiwar petition. With the growth of Nazism in Germany, he became an ardent Zionist, while also raising the problem of Arab rights in the planning of a Jewish state. He then emigrated to the United States, where, despite being a convinced pacifist, he backed armed intervention against Hitler. Realizing that the Allies had to beat the Germans to the invention of the atomic bomb, he wrote to President Roosevelt, thus inspiring the Manhattan Project. After the destruction of Hiroshima and Nagasaki, Einstein ardently protested against the spread of nuclear weapons. He opposed McCarthyism and used his immense prestige to attack all forms of fanaticism and racism. But there were also shady aspects to Einstein's private life. (...)

M: The important point here is not to condemn one scientist or praise another. What matters is the total lack of correlation between scientific genius and human values. This allows us to put science in its proper place. We can then see it in the larger perspective of life and ask ourselves about its true use.

Spirituality, which I see as a process of personal transformation, does not simply complement science. It is a fundamental human need. This is the real problem of the scientific world. Personal transformation is no easy matter, even for people who dedicate their entire energies to it. So if it is seen as having only a secondary importance, the chances of success are even slimmer. To leave spiritual transformation in the background as a sort of optional extra, when it ought to be a core part of one's existence, throws a shadow over the entire scientific enterprise. Its intentions are unclear, its means often not properly gauged, and its results ambivalent. Without a fundamentally positive and enlightened motivation, the exploration of the limits of the possible inevitably takes precedence over the examination of what is desirable or indispensable.

Some scientists think that their work consists entirely of exploring and discovering, and that they aren't responsible for the use their results are put to. Such a position is a mere illusion, willful blindness, or, at worst, just plain dishonesty. Knowledge gives power, and power requires a sense of responsibility and an idea that 'we are accountable, for the direct or indirect consequences of our actions.

Scientific research is often, but not always, conducted with excellent intentions. It then falls into the hands of politicians, military men, and businessmen who put it to dubious use. No one can ignore the close relationship between science, power, and economics. However, few scientists ever raise doubts about researches whose "misuse" is easy to predict. It is often only after the fact that they have

doubts - as was the case for the fathers of the atomic bomb. Others do not even bother to hide behind the supposed neutrality of basic research and openly collaborate in the production of bacteriological weapons and other means to inflict suffering.

T: It is inexcusable for any scientist to work knowingly on the development of instruments of death and mass destruction. During the Vietnam War, I was shocked to hear that several great American scientists, including some Nobel laureates, were members of the "Jason Division" - a committee set up by the Pentagon to advise the military in the development of new weapons. I found it revolting that these great minds would meet each month in order to come up with weapons that would kill as many people as possible.

M: Between 1936 and 1976, the Swedish government sterilized sixty thousand people who were considered to be "inferior." Between 1932 and 1972, four hundred American citizens in Alabama, all of them poor and black, were used as unwitting guinea pigs by the Public Health Service in order to study the long-term development of syphilis. The patients were promised free health care, plus other minor advantages (including five thousand dollars to cover their funerals), if they agreed to go in regularly for checkups. In fact, they received no treatment at all. This was known as the Tuskegee Study of Untreated Syphilis in the Negro Male, and was quite simply a study of the evolution of untreated syphilis, conducted by doctors and respectable scientists who then published their results in equally respectable medical journals. Twenty-eight patients died of the disease and one hundred of secondary complications, while forty wives and nineteen babies were contaminated.

The study was abruptly broken off when a journalist, Jean Heller, brought it to the attention of the general public. Not one of the members of the Health Service that carried out the study expressed the slightest regret. But these were not Nazi doctors. They were civil servants and researchers living in a free country. The victims were finally given some small compensation, but not one doctor was brought to trial. It was only in 1997 that President Clinton apologized in the name of the American people.

In 1978, Dr. Hisato Yoshimura received the highest Japanese award for his work on "the science of environmental adaptation." During the Second World War, Dr. Yoshimura was the director of Unit 731, which carried out experiments on Chinese and Allied prisoners. An example of his studies on environmental adaptation consisted in plunging them into ice-cold water, then hitting them with hammers to determine when their limbs began to freeze. Other experiments included handing out chocolate contaminated with anthrax bacilli to Chinese children, to see how quickly they died. These examples are exceptions - generally, science makes an immense effort to improve the human condition-but they do show that science has no inherent ethics.

T: I firmly believe that scientists should not remain indifferent to the consequences of their research. They must accept the responsibility, especially if military leaders, politicians, and businessmen use their results to wage war, strengthen their power, or earn more money by exploiting the poor and damaging the environment.

M: The arms trade is in fact one of the most exasperating examples of the hypocrisy of rich countries. Ninety-five percent of the weapons made in the world are produced by the five members of the United Nations Security Council! Another example of a total failure of ethics and responsibility.

The same goes for the waste of resources in wealthy countries. Six billion U.S. dollars would give a basic education to the entire planet. Every year, in Europe and America, \$12 billion is spent on perfumes, while the world spends \$400 billion on illegal drugs and \$700 billion on arms.

T: All the same, basic research cannot be blamed for these aberrations. No more can human intelligence. They are simply tools.

M: Indeed. The pernicious or futile use of research results merely reflects ethical weakness, But this is no excuse. Some applications of scientific research, such as genetics and atomic energy, may have whipped up public interest, but most people are not really concerned with ethics. This is a matter for special committees, whose conclusions have little impact on daily life. Political opportunism and, even more, the sacrosanct laws of the free market dominate.

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Another striking example is the total inability of governments to limit the discharge of toxic gases into the atmosphere, even though it is quite clear that our lives will be seriously affected. Only a worldwide movement, based on each person's determination, can eliminate this. It is perhaps in this context that a nondogmatic spiritual approach, such as Buddhism, could play an important role.

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T: But what does this have to do with ethics?

M: The basis of ethics is extremely simple. Nothing is intrinsically good or evil. Good and evil exist only in terms of the happiness or suffering they create in ourselves or in other people. If we adopt a truly altruistic attitude, so that we are deeply concerned with the well-being of others, then this becomes the surest guide for our judgment. In our daily lives, we will then be able to see far more easily which actions will bring about more happiness and will relieve more pain. This is direct experience, and not a moral theory or a set of predetermined rules. It means paying constant attention to our motives. The mind has been compared to a crystal that takes on the color of the place where it has been placed. It is neutral. Our intentions determine the true nature of our actions, no matter what their appearances might be.

The point is neither to condemn those who are driven by hatred, greed, pride, or jealousy, nor to tolerate such destructive emotions as if they were intrinsic parts of existence. Instead, they are treated as symptoms of a disease that can be cured, if we make the necessary effort. Buddhism's approach is in fact extremely pragmatic. Scientific research provides us with information, but brings about no spiritual growth or transformation. By contrast, the spiritual or contemplative approach must lead to a profound transformation in the way we perceive the world and act on it. It is not enough to know, as in quantum physics, that our consciousness can't be isolated from the rest of reality. We must understand by personal experience that it is a part of that global reality.. The move from theoretical knowledge to direct experience is the key to ethical problems. When our ethics reflect our inner qualities and guide our behavior, then they are naturally expressed in our thoughts, words, and deeds. They thus inspire others.

T: So it's a matter of making theory and experience coincide.

M: Yes, this is what brings out the true value of experience. It isn't enough to discover scientifically that our own consciousness is intimately bound up with the whole of reality. Our minds must assimilate the implications of this discovery, and our lives must change accordingly. Practicing Buddhists know that when they perceive their own interdependence with the world, they are filled with an irresistible compassion toward every living being-a compassion that radically transforms their existence. Those who have met the Dalai Lama, for example, know that a few moments in his presence are more eloquent than a hundred speeches about love and compassion.

As for the Buddhist method of discovery and transformation, it is generally a gradual one. It begins with absorption and study, it proceeds with intellectual analysis, culminating when we integrate into our being, thanks to meditation, a new way of looking at things and of behaving. In this context, to meditate means becoming familiar with this new perception of the world. Comprehension leads to meditation, which is then expressed in actions. We thus pass directly from knowledge to inner accomplishment and finally to active ethics.

Our society produces few wise men. It sets up ethics committees made up of great thinkers. In the Tibetan society where I live, it would be inconceivable to include on such committees people who did not possess indisputable human qualities in every sense of the term. It would be hard to imagine spiritual masters who could excel in teaching spirituality while at the same time remaining selfish, irritable, vain, or bad fathers. No one would ever consult them.

T: In the West, committees of "wise men" are generally chosen according to professional criteria. Human qualities are less important. And yet it is obvious that true wisdom is a matter of the heart as much as of the mind. The spiritual approach could provide us with a guide for personal conduct. In my field we are faced with numerous ethical problems, which will become even more pronounced in the twenty-first century, such as nuclear proliferation, the destruction of the environment, cloning, genetic manipulation, and perhaps the selection of certain human characteristics. Should research be controlled? The answer requires a great deal of thought, for it is also necessary to protect the freedom to create and to discover. The imagination must be allowed to express itself freely, otherwise it will die.

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