

## **Nālandā Dialogue in History and Philosophy of Science**

### **Vol I: Scientists Meet Traditional Indian Philosophers**

#### **Introduction**

Philosophy and the sciences have always been intimately related. Until the “scientific revolution” of the 17th Century, science was simply a part of philosophy. At that time, the natural sciences broke off from philosophy, establishing themselves as *sui generis* areas of study. And in the next few centuries, various social sciences did the same.

However, an intimate relationship still remains. There is a dialectical relationship between the two areas of investigation. Developments in science have provided much new material about which to philosophize, be it the nature of unobservable objects, of time, of species, of the mind, or other things. Conversely, philosophy has provided a backdrop of ideas against which science can develop, be it that of positivism, (non-)determinism, the nature of consciousness, or other things. Indeed, as the historian and philosopher of science Thomas Kuhn pointed out, in times when things do not really seem to be working out in a science (periods of crisis, as he put it), scientists tend engage in philosophy, worrying about the metaphysical presuppositions of their science, which they normally take for granted.

There was a great deal of science before the scientific revolution in both Eastern and Western cultures. To name just a few of the more obvious scientific developments: in the West there were developments in mathematics (notably geometry), astronomy, dynamics, biology; and in the East there developments in mathematics (the discovery of zero and decimal notation), pyrotechnics, magnetism, and medicine. True, pure mathematics has always had a somewhat borderline status as a science, but measuring and counting (geometry and arithmetic) have always been an integral part of applied mathematics, and so part of science. And one might think of some of these

developments as technology rather than science; but technologies always goes hand in hand with theories of how the technologies work. And even if one holds that some of these Ancient theories have turned out not to be true, truth is not a necessary condition for a theory to be scientific, as the history of science bears multiple witness.

Despite this, I think it fair to say that modern science is very much a child of the scientific revolution, which was a Western event; and so the philosophical engagement of modern science has been primarily with Western philosophy. Indeed, it must be said that Western scientists and philosophers have known little about the Asian philosophical traditions. However, the Asian philosophical traditions are as rich and deep as those of the West—as many Western philosophers are now, somewhat belatedly, coming to realise. And they provide just as fruitful conversation partners with modern science as does Western philosophy.

If there has not been much of a conversation till now, this is due entirely to the fact that Asian traditions have been marginalised in Western cultures. Things are, fortunately, slowly starting to change. Hence we are seeing the beginnings of dialogues between modern science and the Asian philosophical traditions. The Nālandā dialogues are dedicated to promoting such discussions; and the papers in what follows are a contribution to this project.

The ancient Indian institution of Nālandā flourished in the second half of the first millennium, CE, before it was destroyed in about the 12th century. At its heights it is reckoned to have had some 10,000 scholars, teachers, and students, inquiring into science, religion, philosophy, art, and other parts of human culture. People came to study there from within and without India. As such, it was one of the great centres of learning of the Ancient/Medieval world. Nālandā was a Buddhist institution—which was what attracted the non-Indian scholars who went there. Hence, the studies were largely grounded in the Indian Buddhist culture of the period.

The modern University of Nālandā, which is responsible for producing the volumes in which the following papers appear, was founded about 10 years ago, and was inspired by the thought of continuing the mission of the Ancient university in the context of international 21st century education. Unsurprisingly, then, many of the papers in what follows concerning Buddhist thought.

Buddhist thought and modern science may fruitfully converse in a number of different areas. Let me mention briefly just three.

Perhaps the most obvious concerns the science of the mind. Buddhist philosophy contains sophisticated discussions of the many different kinds of mental state and their interactions. Moreover, it has a long history of using meditation practices to change the way the mind works. Modern science has taught us a lot about the neuro-anatomy of the brain and how this underlies mental processes. Clearly these can be fruitfully put together. For example, real-time imaging of the brain can teach us a lot about the effects of meditation practices. Research of this kind is currently under weigh in places such as the Mind and Life Institute in Virginia.

Another fruitful area for dialogue concerns logic. It might not be obvious that logic is a science, but around the turn of the 20th century logicians started for the first time to deploy powerful mathematical techniques to analyze norms and techniques of reasoning. The result is that contemporary logic is a branch of applied mathematics. Most Western logic (including contemporary logic) has been based on the thought that declarative sentences are either true or false, but not both. Many Buddhist *sūtras* and *śāstras*, however, deploy a logical trope called the *catuṣkoṭi*—four points/corners. According to the *catuṣkoṭi*, declarative statements can be true (and true only), false (and false only), both, or neither. These are the four points (*koṭis*) in question. In recent years, mathematical logicians have discovered systems of logic based on this very idea—though their discovery had nothing to do with Buddhism. These systems can help us

understand the reasoning in the Buddhist texts; and in return, Buddhist philosophy can help us understand ways of seeing what might be at issue in deploying such formal logics.

A third area of dialogue between modern science and Buddhist thought is perforce much more speculative. With its doctrine of *pratītyasamutpāda* Buddhism has always stressed the interconnectedness of things. In Mahāyāna Buddhism this develops into the view that everything is empty (*śūnya*) of intrinsic existence: everything is what it is only by depending on (some) other things. In Chinese Huayan (華嚴) Buddhism, this is universalised: everything is what it is only by depending on *all* other things. The idea is illustrated by the metaphor of the Net of Indra. Indra has hung a net through all space. At its nodes are brightly polished jewel. So in every jewel is reflected every other jewel, reflecting every other jewel, reflecting every other jewel... The jewels represent the objects of reality, and the reflection to infinity represents the fact that each object encodes (interpenetrates with) every other object.

In quantum mechanics there is a phenomenon known as entanglement. Two objects, say particles, can be in an entangled state, so that what happens to one can effect what happens to the other instantaneously, even though they are light years apart. Clearly, each is dependent on the other. Moreover, it has been argued that all the objects in the cosmos are deeply entangled with each other. The physical conditions immediately after the Big Bang were such as to produce this entanglement, and nothing that happens thereafter can change this. Clearly, entanglement is a form of emptiness. And, the entanglement of all objects in the cosmos would be a striking realisation of the Net of Indra. Whether the similarity here is superficial, or deep and profound, is something that will have to be resolved in ongoing dialogue.

Let me close with a comment on the relationship between Buddhism and science. In theistic religions it can be held that some things can be known only because they have been revealed (to some lucky people) by an omniscient god. Hence, if what is supposedly revealed clashes with

what science says, science must be rejected. In this way, Christianity has been at odds with science many times since the scientific revolution, from the Church showing Galileo the thumb-screws to the religious attacks on Darwin. Nor is this a thing of the past, as so called “creation science” in the United States currently bears witness.

In Buddhism, there is no god, and so no potential for this sort of clash. Indeed, because there is no such thing as a divine revelation, all one is left with is trying to make sense of things as best one can with one’s own intellect. Thus, as the Buddha himself is recorded as saying in the *Kālāma Sūtra* (I paraphrase): don’t believe something simply because some sacred text tell you that it is so, or because some religious personage tells you that it is so; investigate for yourself, and believe it if it stands up to inspection—albeit with the help of appropriate experts. And when it comes to things within the purview of science, the experts are the scientists. Thus, the Dalai Lama is on record as saying that if anything in science clashes with a Buddhist teaching, it is the teaching which must be revised—though of course, scientific views are themselves fallible, and so subject to revision.

Hence, a dialogue between science and Buddhism can be fruitful for all parties. Science can learn from Buddhist philosophy; and Buddhist philosophy can learn from science. This is the way that good friends learn from each other.

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