SCIENCE & SPIRITUAL QUEST

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आ नो भद्राः कर्तवो यन्तु विश्वतोऽदब्धासो अपरीतास उद्भिदः । (RgVeda) *Let noble thoughts come to us from every side*

Science-Spirituality Dialogue
Theoretical science, Applied science and Bioethics


A Discussion with
Prof. Arthur L. Caplan (left),
Drs. William F. and Virginia Connolly Mitty Prof. of Bioethics at NYU Langone Medical Center
and **Dr. T. D. Singh** (right);
Physical Organic Chemist, Founding-Director of BI

Dr. T. D. Singh (henceforth TDS): I understand that your fields were primarily history and philosophy. How did you come to bioethics?

Arthur L. Caplan (Henceforth ALC): When I was heading for my philosophy of science degree, I was a student of a famous mathematician; in fact I was his last graduate student. He said, "You know, the areas of science that are not understood well are the differences between applied science – engineering, medicine, agriculture – and theoretical science. A useful topic would be if you could explore somewhat what make an applied science a different science." So, I started looking at medicine to see what was its relationship to biology. For example, is it just applied biology, or there are separate theories and views within medicine? ... does the need to study the whole organism in a holistic sense makes it different from the reductionistic approach that a biochemist might see in genetics?

And from there I got interested in other value questions. … the concern for the value side of the field of medicine that made me interested in some other ethical debates.

TDS: That was remarkable! It seems to me that ethics, in the western perspective, deals with what is right or wrong, what is good or bad in human actions. In India, we generally refer to the spiritual perspective; we accept values in accordance with the religious teachings. The idea is that unless we have a very clear conception about what life is, in particular what human life is, we cannot have a clear understanding of ethics, bioethics, or global ethics. I find this is interesting. Would you like to give your comment or opinion?

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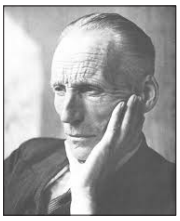
On the SHOULDERS of GIANTS



L. E. J. Brouwer

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NEWS BIRDS

Seminar on
Being Human in the Age of Science & Technology
29th January 2020
IIT-Bhubaneswar

ALC: This is a very interesting question. … medicine is unique in that it ... can be a bit more universal, because it has this notion of health and disease. But to understand what health and disease are, requires an understanding of what is life . So, to start to talk about what is good, you do need to know that safer nature for human beings. … In some other areas, you want an answer, because you want to know when life began, why you need to respect life. These are important questions.

TDS: Thanks. … we see today around the world, that some molecular biologists are very focused on life as being a product of complex molecular reactions. ...So, these concepts are either called reductionism or materialism, and it seems to me that when we develop our ethics or bioethics or biomedical ethics, we find that there is some kind of incompatibility between these two lines of thoughts.

I feel that the dialog between science and spirituality can help in bringing new lights and a real synergy. Science primarily deals with the physical world frame, with physical knowledge; and religious traditions or spiritual wisdom can inspire ethical views by demonstrating what is the deeper concept of life, the meaning of life, and its purpose. Although ethics is not purely spiritual or theological, I think it is quite close to it.

ALC: Yes, it is more or less that side. The other thing you might say is, there are different ways of getting knowledge for the purpose of building ethics. I respect the scientific way of knowing things, in fact I respect it deeply, but sometimes information comes from intuition, or experience, or faith, if you want to put it this way.

[Excerpt from the book, *Savijnanam* vol-9— *Scientific Exploration for a Spiritual Paradigm*, Bhaktivedanta Institute, Kolkata]

On the Shoulder of Giants

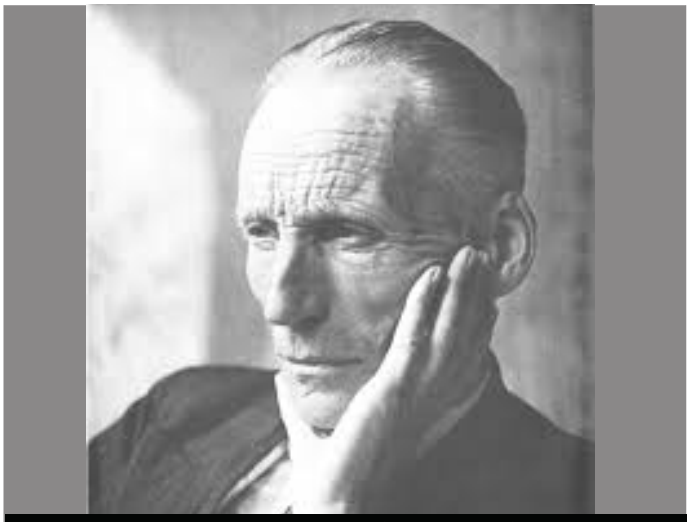
L. E. J. Brouwer

A Mathematician on Self

L.E.J. Brouwer, was a Dutch mathematician, best known as the founder of intuitionism in mathematics. In classical mathematics, his ground-breaking work include: the fixed point theorem, the simplicial approximation theorem, the definition of a topological dimension function, the definition of degree of a map, and the topological invariance of domain. Thus, Brouwer is considered as the founding father of modern topology.

Luitzen Egbertus Jan Brouwer was born on the 27th of February 1881 at Overschie, the Netherlands. He is usually cited as "L. E. J. Brouwer", but was called "Bertus" by his friends. His father, Egbertus Luitzens Brouwer was a schoolmaster at a primary school and was a tough disciplinarian. However, Brouwer would often escape from home to spend a night in the dunes something his father would not allow. Once, he even managed to lock his father into the cellar to go up there. Brouwer was no stranger to daring facts. He was an inveterate climber in trees, buildings, etc. Even at the age of seventy-two, at a picnic during a meeting in Canada, he upset his company by suddenly disappearing. To everybody's surprise he was discovered up in a tree.

At school, Brouwer was a brilliant pupil who excelled in all subjects. This enabled him to cut short his elementary school years and to get into high school three years in advance of the normal entrance age. He passed with full honours the entire scale of secondary school examinations. At the age of 16, Brouwer attended the gymnasium and graduated with top marks. In 1897, he entered the Gemeente Universiteit ('Municipal University') of Amsterdam to study mathematics and physics. In 1904, Brouwer presented his new results on continuous motions in four dimensional space and baffled



L. E. J. Brouwer (1881–1966)

his adviser, Professor Korteweg. After attending Mannoury's classes on the philosophy of mathematics, Brouwer felt exhilarated. In 1905, Brouwer published a monograph—'Life, Art and Mysticism' (*Leven, Kunst, en Mystiek*) presenting a mystical doctrine that man's ultimate goal and challenge is total introspection—a turning into oneself (*zelfinkeer*). In 1907, Brouwer defended his doctoral dissertation, "On the Foundations of Mathematics" ("*Over de Grondslagen der Wiskunde*"). The dissertation was very much in line with the ideas from "Life, Art and Mysticism". He describes true mathematics as a free creation that consists of mental constructions that are executed within the isolation of the human mind. Language is exterior to mathematics and merely an imperfect means to communicate one's mental constructions to others. Out of these ideas was born "intuitionistic mathematics".

In the next five years, Brouwer addressed the field of topology in a flurry of lectures and over 40 scholarly articles. In 1912 he was appointed as a professor of mathematics at the University of Amsterdam, and soon resumed his research into the foundations of mathematics. Brouwer gained international recognition from several societies and academies. He received honorary doctorates from the universities of Oslo (1929) and Cambridge (1954), and was made Knight in the Order of the Dutch Lion in 1932.

From his early years, Brouwer displayed philosophical bent of mind that became prominent in later life. His mother recalls, that as a three year old boy, Brouwer asked the question 'What is I?' This inquisitiveness to learn more about the eternity and self propelled him to explore into the Eastern and Western traditions of spirituality and mysticism. In his lectures, Brouwer often quoted long passages from *Bhagavd Gita*, to express his views about liberated life, mind, consciousness, transcendental truth, language, the world and religion etc. Denouncing logic as a source of truth, Brouwer said, "...the fullest constructional beauty is the introspective beauty of mathematics, where instead of elements of playful causal acting, the basic intuition of mathematics is left to free unfolding. This unfolding is not bound to the exterior world ... and that research in foundations of mathematics is inner inquiry with revealing and liberating consequences, also in non-mathematical domains of thought."

Thus, Brouwer's life and work paves way to view mathematics as a sacred subject in the quest for Reality, and not just a servant of natural science. Indeed it appears, that he was meant for this mission as expressed by Brouwer to his friend Scheltema: 'Did I wish a kingdom on earth, then it would perhaps be good to wall in myself in mathematics ... But I desire a kingship in better regions... We are not on earth for our pleasure, but with a mission that we have to render account for. And a small kingdom by the Grace of God is better than a large one by the will of the people.

Vedanta & Science

Dealing with Bioethical Questions

In 1990, the Human Genome Project formally began as an international effort to sequence the entire genome of humans. The human genome project was completed in 2003. With the human genome at our hand, the bioethical issues have become much more deepened. The most serious impact of genomics may well be on how we view ourselves and each other. It requires our constant vigilance, lest we may lose sight of who we are, why we are here, what we wish to become and what the purpose of our lives is.

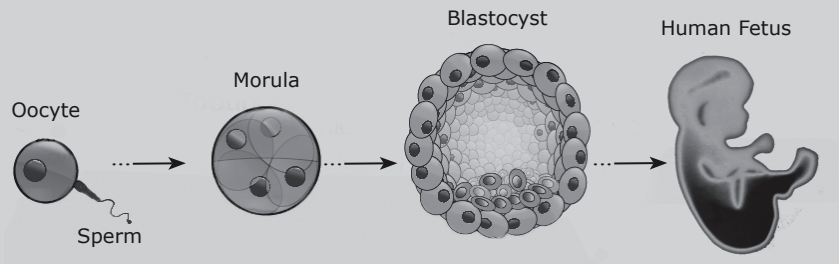
Determining the structures of all the genes in a cell doesn't explain the lively workings of the cell. In the last fifty years, we have discovered many details about living systems and we can even manipulate their bodily structures in many astonishing ways. But we still do not know what life is. Even with the human genome in hand, the understanding of life still remains a mystery.

The Human Genome Project, though extremely useful, is related to only the physical aspect of a human person. It is inadequate to describe the complete human person since a person is far more than a mere collection of molecules or genes, however sophistically organized. A person is much more than his genome.

The freezing and storage of embryos entails a serious question about life and leads to many problems such as denying the human rights to the tiny child, or belittling respect due to a human being. It is deeply questionable whether the embryos should deliberately be placed in a situation where their natural developments are suspended, and their lives and future developments endangered.

This process will create ethical and legal concerns. Marriages will not be necessary for creating progeny. This can lead to a breakdown of society and family. Who is the mother? Of what nature will that baby be? What would be its feelings and affliation towards the woman who collects it? What kind of bond will be there between the baby and the parents? A number of controversial cases have been reported. Such actions cause great moral and ethical problems in human society.

Most of the bioethical issues mentioned above arise because we do not have any spiritual dimension of life in our modern scientific framework. If life is merely a bunch of molecules, as chemical evolutionists claim, why do we need to bother at all about ethical issues? The very fact that humanity has such a serious concern for ethical issues points out that we are more than a mere physicochemical combination. What are we then? What is a human being, or more fundamentally, what is life? What is life's meaning and purpose? Answers to these questions will be the key to resolve many of the bioethical issues raised above.



The Beginning: A few stages in the development of human embryo. (Courtesy: Wikimedia Commons)

According to Vedanta, ...life is sacred and ...discarding the embryos at any stage after the moment of conception, in whatever form, is prohibited. The absence of bone, skin, heart, liver, etc., in the zygote does not imply that it is lifeless.

The first 'test-tube baby,' Louise Brown, was born on July 25, 1978, in Oldham, a town in Northwestern England, amid intense controversy over the safety and morality of the procedure. Yet, even as many cheered this new medical breakthrough, others were worried about future implications, for it raised many ethical problems. Some people object to the very principle of external fertilization on social and traditional grounds. There are doubts about the origin and procurement of sperm, both in relation to the methods used as well as the concomitant risks. Some raise doubts about the eventual risks for the further development of the embryo. When does life begin? If human life begins at conception, are doctors killing potential humans when they discard fertilized eggs? (Doctors may remove several eggs from the woman and may discard some that have been fertilized.) Is this process foreshadowing what is to come?

According to Vedanta, material life begins at the moment of conception, and life is sacred and human life is very rarely obtained, discarding the embryos at any stage after the moment of conception, in whatever form, is prohibited. The absence of bone, skin, heart, liver, etc., in the zygote does not imply that it is lifeless. The vast and rich wealth of profound insights contained in the Vedanta can shed immense light on this in the dark and pivotal time that we are facing today.

[Excerpt from the book, *Vedanta and Biotechnology*, Bhaktivedanta Institute, Kolkata]

Report

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