

# Science, Enlightenment and Humanism

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At the recent World Humanism Day seminar at Parliament House, Sydney, the theme was the role of the Enlightenment in the development of humanist thought. My new role as President of HSNSW has led me to reflect further on the journeys many made from the physical sciences to the social sciences.

## Enlightened Activists

Giordano Bruno, a philosopher, hypothesized that the earth revolves around the sun, and even suggested the stars are also distant suns with planets orbiting them. He suggested this was an example of the magnificent work of God, thus attempting to reconcile the emerging scientific observations with the human-centred dogma of the despotic Catholic Church. But the church would not deviate one iota, and Bruno paid dearly, being imprisoned and burned at the stake in 1600. This was not the only violence attending to the enlightened, as we shall see.

Meanwhile, Galileo turned his telescope to the skies, and revealed the nature of the major planets and their moons. Again the Church insisted that anything other than man at the centre was heresy. However Galileo had earned favour with the Italian aristocracy, and he was “merely” sentenced to house arrest.

The church belatedly apologised for this, but we are still waiting for their remorse over Bruno.

But for me the path from physical sciences to social sciences is exemplified by Isaac Newton. Everyone knows that he developed the fields of calculus, motion, and gravity, which he then unified in *Principia* (1687) to describe and predict everything mechanical we see around us. Less known is that he went on to become a very capable public servant, rising to manage England’s currency as Warden of the Royal Mint. One of his many achievements was to convict and hang the head coin forger of the time. Enlightened views need to be put into effect through action!

Figures such as Locke, Rousseau, Diderot, Condorcet, Kant, Hume, Paine, Jefferson, Franklin and Leibnitz are well known for their contributions both to science and to society.

A favourite is Carvalho, the Marquis of Pombal, who in 1761, arranged the trial and execution of Malagrida, the leading Catholic in Portugal, and hence brought the Inquisition to sudden stop. Is execution justified if it curbs a tyrannical regime?

My own path has in some ways been similar to those Enlightenment figures. I qualified in physics and engineering at university, and made my career in aerospace engineering. I developed complex methodologies for design of rocket and space missions, including all possible things that can go wrong, known as risk and hazard analysis. Since my retirement I have asked, can such methods be applied to the social sciences?

## Physical sciences to Social sciences

Today, in the Western world, I see all around me, ways in which our comprehensive scientific knowledge is being used to illuminate the human condition and hence improve human (and animal) welfare. That I believe is humanism at work.

Physics has shown how the universe works, at a fundamental level. At the bottom it is all particles and fields. Electromagnetism gives rise to nuclei, atoms, molecules, DNA, bacteria and humans. Nuclear forces give rise to stars and radioactivity. Everything that has happened since the Big Bang is well explained (at the fundamental level) by these basic interactions. The remaining mysteries such as dark matter and dark energy are yielding to science.

Social questions such as minds, sentience, behaviour, and psychology are yielding to neuroscience, and are clearly additional layers of complexity derived from the same basic laws. There is no credible research at all into ghosts, angels, demons, souls, telepathy, afterlives etc.

The search for additional phenomena has led to the six billion dollar Large Hadron Collider, and has revealed the Higgs Boson – a hint of a deeper layer, but no violation of the familiar laws of physics.

There is no room for other effects which would be required by supernatural or paranormal events. Gods are out, prayer is merely an internal brain process. I have presented an illustrated talk called *Fundamental Physics and the Supernatural*, to explain this.

Biology has shown that a human life starts when a sperm combines with an egg. Women made pregnant by holy ghosts are out. A human mind is fully dependent on a life support system, without which it degrades and dies. Past lives and resurrection is out.

Research in neuroscience has shown how brains work at a basic level, and is yielding clues into the human mind, behaviour and emotion. Thought, reasoning, freewill, dreams, conscience and consciousness are revealed as internal functions of the brain. Astral travel, near death experiences, prayer, psychic abilities and telekinesis must be illusory, as physics provides no means of communication apart from the familiar senses. Thus pseudoscience is dismissed as nonsense.

Humans are shaped by genes (packages of DNA from their parents) and memes (elements of behaviour passed down from parents and society). Humans are responsible for their own actions. There is no means of passing down memories from generation to generation – past lives and reincarnation are out. We have one life, so make the most of it.

Psychology is illuminating the higher levels of mental activity. To become a responsible adult requires around 20 years of careful teaching. So we in Australia need to support the Gonski reforms which provide education where it is needed. More broadly, we should rise up against those using guns and bombs, which can undo all that in a millisecond. We should intervene to stop Islamic extremists burning down schools and kidnapping the next generation of the enlightened and selling them into rape.

Science has illuminated the study of ethics. Brains provide the capacity for pleasure and pain, and we can begin to measure that capacity, at least in relative terms – through the life cycle, through evolution, through trauma, and through chemical interventions - that is what anaesthetists do.

We know the factors which affect human welfare – these are called *needs*. They include available water, food, shelter, relationships, freedoms, hopes and opportunities. Animals generally have a lesser set of needs. Such *Objective List* methodologies can provide scales for welfare.

Sentience and welfare combine to provide a quality of life, which can be positive or negative. Thus I believe we are in a position to scientifically measure the *merit* of moral decisions. I have a talk on this subject called *Measuring Morality*.

Even without the quantitative aspect, this knowledge enables us to formulate simple societal rules which, if followed, will maximize quality of life. This gives rise to *universal human rights* such as freedom, compassion, justice and equality, to replace those handed down by so-called prophets which are usually designed to protect a jealous deity.

Science shows that sentience in a fetus is very low if present at all, being dependent on myelination and the proliferation of axons. Thus a fetus can in no way be considered a person – this resolves the so-called *Zoe's Law* question. Its destruction in abortion can cause no significant pain, although the effects on the mother may be serious. Stem cell research need not be restricted, and can benefit the living.

Towards the end of a life, sentience and welfare inevitably decline. By measuring them we can make better decisions concerning voluntary euthanasia, and switching off of life support. I propose that Humanists can prepare an *Advanced Health Care Directive* form which will better reflect enlightened wishes than that currently available.

These views have been reinforced by my teaching of ethics in NSW schools, where the curriculum material is very much in accordance with the humanist stance.

In this paper I have tried to illuminate the path from science, through enlightenment, and finally reaching human welfare. I believe that science can illuminate all the values held by humanists.