

The responsibility of scientists to society

In its simplest definition, science can be thought of as the pursuit of truth. Truth that stills holds true without our existence, obtained methodically through observations, experimentation and research. Coined satirically by English philosopher William Whewell in 1833¹, the term 'scientist' describes a practitioner of this scientific method. The motivations of scientists can vary, from the selfless desire of understanding to the application of scientific knowledge to benefit other's health, the environment, and industries. Not all Scientists however follow a path paved with good intentions, as many can be corrupt by personal gain or political conflict, ignoring the wellbeing of humanity for their own recognition and power.

The responsibilities of scientists are not as clear-cut as those associated with say law or medicine, where the aim underpinning the profession is more clearly defined. Jacob Bronowski, a British Mathematician, says: "The best science is driven by an insatiable curiosity for how the world works. Applications are secondary"². In reality it is debatable whether science with no application to mankind is of any worth, however many will argue that applications can proliferate from information that was found without applications in mind. Such circumstances are exemplified by quantum mechanics, a field of physics which at first had no known practical use. Several technologies are now owed to quantum mechanics such as the microchip, electron microscope and magnetic resonance imaging³, despite the fact that the original research was not performed in pursuit of these technologies.

Many will argue that the responsibility of scientists is to obtain useful knowledge in such a manner that will not cause any distress, harm or detriment to those involved with the experimentation that acquires the knowledge. Conversely, there may be situations in which the best outcomes can only be efficiently reached if there is some form of harm or loss of life. For scientists there is a continuous battle between what is ethically acceptable and whether breaching these ethics will benefit humanity in the long term.

One such example in which scientific research has been controversial and divided public acceptance involves the experiments performed in the 1950s under Stalin, general secretary of the USSR communist party. With the ominous paranoia of complete apocalypse, Stalin delved into the realms of prolonging of human life, setting up secret laboratories in which scientists could work unhindered by ethical restrictions. Vladimir Demikhov, a red-army veteran of the Second World War, created an Orthos-like dog⁴ in which the head and upper body of a puppy were stitched onto the neck of a larger dog, both kept alive by the connection of their blood-vessels and windpipes⁴.

It was this pioneering breakthrough that set in motion a cascade of events between the USSR and the USA that we can now trace back many of the successful transplantation operations being performed in hospitals today. It's undeniable that very few of us would enjoy lugging around the head of a small child on our necks, obscuring our view and crying as we tried to get to sleep. However, is our empathy with the puppy too great to allow such violations of animal cruelty? Or do two heads make one right? Generally animal life is not held with as high regard to that of humans, but this is not to say that the responsibility of scientists to acquire knowledge is above respecting other life forms. It would seem impractical to avoid loss of life completely as several fields of science would be rendered impossible, for example – stem cell research and organ growth, however, needless loss of life should be avoided.

Regrettably, military interest has sparked several scientific breakthroughs while several others have only been realised to have war-related applications, years, if not centuries after their discovery. If scientists do have responsibilities to society, who is to impose these responsibilities upon them? In times of hostility, is it scientist's responsibility to support the security of their home nation, despite the fact they will be putting other nations at risk? Imposing limitations on scientists and how they go about their work will always be difficult to control. Take for example the UN, an international body designed for world peace, but in reality, the equivalent to a foal telling two tigers to 'play nice'.

One such story of the double edged sword of science is that of Fritz Haber, the father of industrial nitrogen fixation. It is estimated that two out of every five people now living would be eating from empty plates if it were not for his pioneering work on what is now known as the Haber process⁶. Nevertheless, many more would also still be alive, had they not been asphyxiated in chemical warfare, to which he is one of the founding fathers of. Although Haber had an active role in the darker side of his discoveries, the same cannot be said for all scientists. Einstein for example had a more pacifistic role in his work, who despite being linked to the H-bomb opposed the bloodthirsty direction that Hitler was taking German science.

War highlights several issues in terms of the responsibilities of scientists. The greatest science has usually fruited from large scale cooperation, for example the Human Genome project and Large Hadron Collider are examples of international collaboration between scientists. Scientists should uphold honesty in their work, sharing this work those that wish to know it. Alas, there may always be unforeseen negative implications of their work, for example, where one scientist sees an infinite clean energy source; another may see the settlement of a religious dispute. It would be impossible for scientists to foresee all the applications of their work, as unforeseen technology able to manipulate their discoveries may be developed beyond their lifetime.

Scientists can often be viewed with an element of snobbery, keeping the world's secrets to themselves and those in the know.

To maintain the respect and integrity of the profession, honesty, public awareness and peer assessment is an essential responsibility that scientists must execute in their work if they are to maintain public support and trust.

Religious followers may argue that scientific breakthroughs are futile as it is the God's who decipher how the world works and will introduce new diseases or catastrophes to limit the size of the population, irrespective of any medical or other scientific progresses. Similarly whether science has truly benefited our lives or corrupted it is still unanswerable. Unlike religion however, the responsibility of scientists is not to tell man how to live, merely to enlighten man about what he sees and why he sees it, if he chooses to believe it.

The truth scientists obtain should be impartial, accurate and shared openly amongst everyone, not just the general scientific community. Scientists should not be solely motivated by an application of their work, public attention or incentives but merely the pleasure of understanding. They should make a combined effort to predict the implications of their work, and with the aid of the government, their knowledge should be delivered in a way that will benefit mankind, not just a few men alone. What is clear however is that the pivotal responsibility of scientists is to produce a world in which ignorance is not bliss.

Word count: 1,199

References

¹<http://en.wikipedia.org/wiki/Scientist>

²Chapter 3 of Kovacs 2004

³http://en.wikipedia.org/wiki/Quantum_mechanics

⁴<http://www.theoi.com/Ther/KuonOrthros.html>

⁵<http://www.mymultiplesclerosis.co.uk/stranger-than-fiction/head-transplant.html>

⁶<http://www.chemheritage.org/classroom/chemach/gases/haber.html>