Science as a Human Value

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Recently, a colleague, stating he was paraphrasing former U.S. President Ronald Reagan's comments on space exploration, told me that the ultimate goal of any medical researcher was "to touch the face of God".[1] When pushed for clarification, he asserted that science – neuroscience in particular – is a utopian pursuit (free from the foibles and fallacies that normally plague people), whose practitioners (i.e. scientists) must altruistically strive to make fundamental insights into the workings of Nature, Humankind and the Human Mind. Idealistic though this statement may be, it is somewhat incomplete, failing to adequately capture the real impact of science upon day-to-day human progress, and neglecting to fully represent the relationship of modern science to the standards by which humans conduct their lives. Whether we like it or not, science is unquestionably an integral part of the modern human culture and of the ongoing human struggle. This is not a new idea – perhaps more than anyone else, the eminent Polish-British scientist Jacob Bronowski, through his writings and presentations, was a passionate advocate of this dictum.[2] Science and the practice of science are very human activities.

In modern times, the principles and practices of science have become increasingly complex and ever-changing. As conventionally practiced, science is a multi-disciplinary process dedicated to the pursuit of knowledge via the human-driven organization of data; in turn, this leads to the identification of new information with which to facilitate the continuing search for unifying principles amongst previously unrecognized connections and likenesses, thereby enabling humankind to better recognize the underexploited (or overexploited) potential of nature, while lending additional order and meaning (and beauty) to the human experience. The modern world is penetrated, permeated and powered by science, and to neglect the complex interrelationship between science and humankind is dangerous – especially when one considers the multitude of problems presently being experienced by the collected peoples of the world.

Currently, humankind is confronting a myriad of problems. Although the looming spectre of oil shortages always garners considerable attention from the press, the worldwide shortage of potable water is a much greater issue. Life without oil is seriously compromised; life without water is seriously impossible. Regrettably, the problems presented by these impending water shortages may well be compounded by potential food shortages. An environment stressed by unchecked pollution and a climate altered by the processes of global warming (whether secondary to human activities, or not) have the capacity to produce catastrophic crop failures. When combined, water and food shortages will have a global health impact that will herald profound societal changes, straining relationships between nations and cultures. Definitive solutions to such major problems will not come from flexible and procrastinating words of political policy, but rather from the hard-edged and unhesitating actions of scientists and physicians. Real human-based problems require real human-driven solutions, not promissory rhetoric. Such problems can only be solved by promptly attacking them with rigorous science.

In addition to ecological and natural resource problems, humankind is also contending with looming pandemics and health care crises – and if, at some time in the future, one in eight people are dying from a killer flu strain, substantially fewer people are going to care about the cost of oil or if a large financial institution is going to declare bankruptcy. We need to put the human condition into perspective, and we need to look at the long-term, not the next four- or five-year term. Although the 20th century ended with an explosion of activity in gene-related studies and stem cell research, this research has thus far failed to decisively deliver the much anticipated flood of therapeutic advances. Nevertheless, the 21st century continues to evoke promise as the "Century of Biomedical Research," if for no other reason than sheer need. In recent years we have witnessed the global threat of SARS (Severe Acute Respiratory Syndrome), avian flu, H1N1 (swine) flu, and drug-resistant bacterial infections, which have emphasized the ever-looming peril of new infectious disease threats to international health. Previously-established disorders such as AIDS, tuberculosis and malaria have not gone away, but rather continue with significant incidence and prevalence, while long-recognized diseases, such as stroke and Alzheimer's dementia, are becoming even more common as a greater proportion of the human population reaches old age. Once again, these are problems that are better solved with implemented rigour rather than proposed policy – and this form of rigour can only be decanted from the end of a test tube or via a randomized controlled clinical trial.

Arguably, it is indeed fortuitous that the practice of science is a human activity. Clearly, this is a time in human history when our world is in need of humanistic values and creative thought – and science, like art, is an intensely creative process, especially when well infused with human passion and zeal. Be it theorems

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or poems, both science and art seek to solve problems and to create beauty by coaxing unities to emerge from the bewildering vast varieties of human observation and experience. When solving problems, science benefits immeasurably from the human impulse to explore, to question, and to wonder why we wonder. Indeed, the continuing success of human progress (and the concomitant avoidance of potential human catastrophe) demands that civilization preserves the values of creative scientific enquiry, protecting science from persecution and censorship for the common good of humankind.

Since the practice of science is a very human activity, there are of course a number of associated detractions. Scientists are human: thankfully, they can be passionate, compassionate, and altruistic; regrettably, they can also be arrogant, intolerant and fallible. Accordingly, scientists should endeavour to explore nature not with a cudgel, but rather with comprehension. Science is among the foremost achievements of our privileged modern society; science is an essential form of human progress.

And to those who assert that science creates as many problems as it solves, the answer is simple – science is a human activity. The very human capacity of science to produce both good and evil has been appreciated and argued for centuries. Scientists isolate and synthesize complex chemical entities, pack them into tiny pills and ship them out to hospitals and pharmacies just in time to treat strokes, cancers, depression and dementia; these same activities are associated with events that may lead to air and water pollution. Success and failure are inseparable, and in the coming years, humankind will be looking for science to deliver some significant successes. Humankind's interaction with nature is fragile and dynamic, but without human activity – both good and bad – science will have no progress.

The public view of science is rather sterile, typically dominated with images of molecules or microorganisms. Although interesting, such images rarely invoke a deep-felt emotional response. When I reflect on the goals of science, the personal image that is conjured is a mental image of a former patient when I told her that her seizures were from a glioblastoma multiforme. For me this compelling image captures and conveys the personal misery and intense emotional agony of a young woman afflicted with an incurable disease, providing a timeless, poignant and emotional glimpse into why we should be doing science – not only to provide fundamental insights into nature, but also to discover tangible ways of improving the lives of people. We should, indeed must, remember this. Science is a very human activity.

Yes, scientists must strive to make fundamental insights into the workings of nature, but they must also achieve much more. Scientists must also reach out and touch people!

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References

1. Magee J. The complete works of John Magee, the pilot poet. Cheltenham, Gloucestershire: This England Books; 1989. (Quote is from the Challenger Space Shuttle Explosion speech given by Ronald Reagan on January, 28 1986; however, the original quote is from the poem High Flight by Pilot Officer John Gillespie Magee, Jr., an American flying for the Royal Canadian Air Force during the Battle of Britain, written on September 3, 1941).
2. Bronowski J. Science and human values. New York: Harper & Row; 1956.