

## **Science, absent of greed, betters humankind**

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When science is combined with good ethics, these two can work together to improve the ethical quality of human life.

Good science involves free and open enquiry. It requires scientists are careful in their studies. They also need to be willing to accept the conclusions the evidence leads them to rather than being led by preconceived notions that they or their sponsors desire. Good science involves taking on tasks to which there is testable evidence. Similarly, usually good science begins by a hypothesis that can be subject to testable evidence and review by peers.

To be effective, scientists must have freedom to make their findings published or open to the general public and to other scientists. Good science should lead to the advancement of general knowledge and thus to the public good or to improvements in overall human welfare.

What leads to general knowledge, however, is not always easy to determine. For example, taking pictures from outer space of the other side of the moon may at first seem trivial and expensive. Yet, such knowledge can be used to indicate features and formations of other bodies in space and to provide information about the composition and structure of other space objects.

There are lots of examples of good science results which have led to benefits to human-kind. Many are medically related and have implications for ethical directions. The use of x- rays and ultrasound and other imaging technologies are valuable tools in medicine. In many cases, it would be unethical not to make these techniques available to diagnose patients.

Science has made helpful advancements in the early detection of cancer, brain scans for dementia, and bone density tests for osteoporosis patients. Doctors have an ethical imperative to use these science-based medical tools to maintain and improve their patients' health.

Science is used to detect air and water pollution and to measure the nutrition of food. Science helps engineers build safer roads, bridges, and buildings. Science is used in electronic communication and modern transportation conveyances. It is used in so many areas of modern living that there are very few of us today who would want to turn back the clock and live as people did 100 years ago.

The list of advancements brought about by good science could go on and on. Nonetheless, to be ethically valuable, it is necessary to have science related to, and accompanied by ethical qualities of caring, compassion for our fellow humans, honesty, and concern for making life better. With the two qualities of good ethics and good science working together people can progress more quickly to a world of informed ethical practices. Yet, even good science can have bad results without good ethical intentions.

Now some comments about what poor science involves. When science is driven by motives like greed it will not often result in ethically beneficial practices. Years ago tobacco companies hired scientists to conduct experiments showing that smoking cigarettes had beneficial results such as calming smokers' nerves, and providing harmless recreation. Smoking was presented fifty years ago as a psychologically relaxing pastime and smoking was promoted as the fashionable habit of the successful people of the day. If scientists who worked for tobacco companies suspected smoking could be one of the causes of lung cancer they were expected to keep that information to themselves if they wanted to keep their jobs.

Unfortunately, there are numerous cases of scientific knowledge which are kept secret but could be beneficial if such information was widely known to the general public. If scientists are not free to speak out about their findings, secret information often does little good to the overall advancement of humankind.

One of the concerns of some scientists whose work is sponsored by Canadian government services is they fear they are not free to disseminate the information they believe citizens in a democracy ought to have available to them. It is sometimes information about the environment, climate change, and other politically sensitive topics on which information is restricted. Recent articles in

Ontario newspapers including London Free Press (Nov. 10, 2014) have addressed this topic, but it is a topic which is too large to discuss in this present article.

In summary, good science shared openly can enable Canadians to make better ethical decisions.