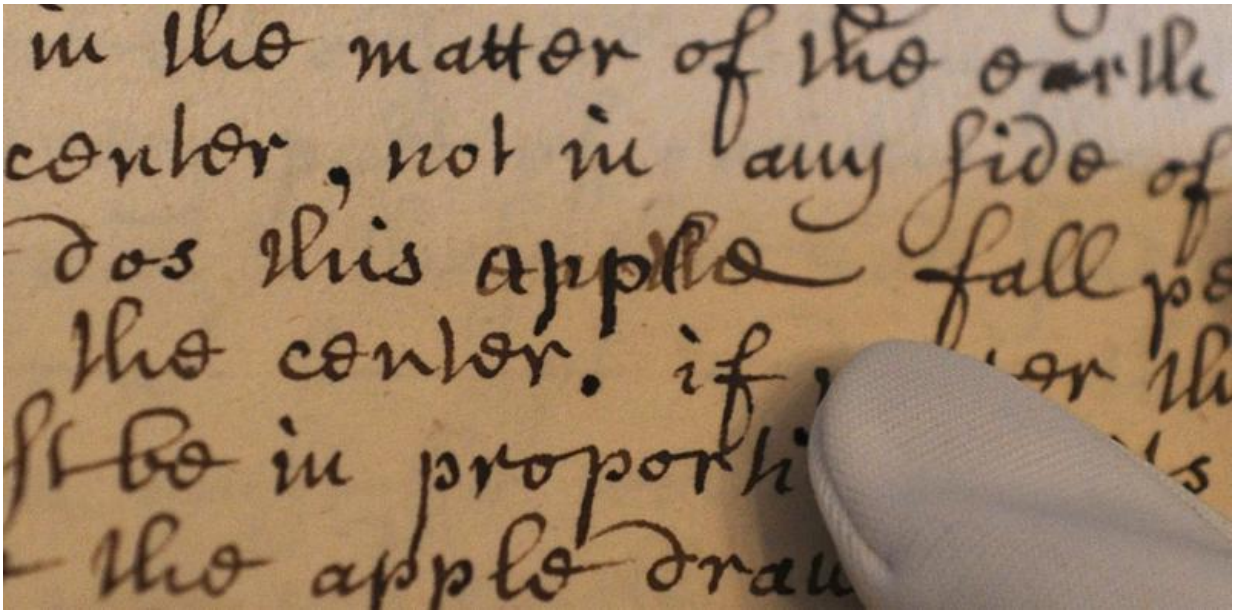
No new Einsteins to emerge if science funding snubs curiosity

August 4 2017, by Frank Labella



The manuscript of 'Memoirs of Sir Isaac Newton' shows the words 'does this apple fall?' Newton's curiosity about the falling piece of fruit helped him develop the theory of gravity. Credit: AP Photo/Lucy Young

All of the great scientific findings of the past emanated from the initiative of individuals spurred by unimpeded curiosity and determination.

Their research was financially supported by themselves or benefactors,

and required only the availability of time for contemplation and conjecture.

For several years starting in 1958, when I began my research as an instructor in pharmacology, I had relatively free rein to follow my instincts, ideas and impulses. As a result, I delved into studies in many different areas: neuropharmacology, mechanisms of general anaesthesia, digitalis drugs, receptor pharmacology, endocrinology and aging, to mention a few.

What I consider some of my most significant research findings were the result of curiosity-based screening of chemical compounds in receptor-binding assays —or the type of work often denigrated by grant application reviewers who earmark research dollars as "fishing expeditions."

Another fishing expedition embarked upon with my colleague, the late Carl Pinsky, also led to the development of a patented electronic sensor, which, in turn, led to the formation of a venture-capital funded company.

'The more papers, the better'

But over the years, a formidable bureaucracy has taken hold at universities as research "productivity" became an obsession. The aforementioned fishing expeditions were no longer an option. Grant success became dependent on publication —the more papers, the better.

Therefore, academics and researchers had to focus on well-designed research proposals that could generate steady, reliable data output. Any diversions that might stimulate curiosity, generate enthusiasm or uncover new avenues of potentially ground-breaking exploration, but not directly related to funded projects, would only diminish productivity.

Commonly, two- or three-year funding for research is awarded by government granting agencies, or by one of many relevant foundations. Grant renewal relies on a satisfactory evaluation of the research achievement for that period.

This bureaucratic regimen unfortunately reveals a demoralizing ignorance of the efforts required to establish and maintain an efficiently functioning research facility. Furthermore, it subjects the researcher to repetitive, lengthy and enervating periods of grant application red tape.

Dissatisfaction with the ever-burgeoning research bureaucracy is global.

Scientists complain

A few years ago, Nobel Laureate Dr. Harold Varmus became head of the National Institutes of Health in the U.S. Upon his arrival, he was told by hordes of dissatisfied applicants for biomedical research grants that innovative proposals beyond the mainstream were uniformly rejected, year after year.

Varmus addressed this apparent deficiency with one fell swoop —he mandated that innovation was to be one of the primary criteria by which research proposals were evaluated.

And in 2014, more than 30 leading scientists, including four Nobel Laureates, also wrote to Great Britain's *The Telegraph* to deplore the current system of granting funding for scientific research: "Sustained open-ended enquiries in controversial or unfashionable fields are virtually forbidden today and science is in serious danger of stagnating."

They added that the "major scientific discoveries of the 20th century would not have happened under today's funding rules."

Newton was an alchemist

Isaac Newton (1643-1727) is a perfect example. His contributions include the optics of colour, a brilliant neuro-anatomical concept of binocular vision, the laws of motion, universal gravitation, the general binomial theorem and the differential and the integral calculus. Furthermore, it's now well-documented that Newton's reading list of theological works was awe-inspiring.

Newton also spent endless hours dabbling in experimental alchemy.

Alchemists were considered misfits for a long time by the scientific establishment of the day. But Newton was obviously ahead of his time as he explored transmutation, the transformation of one element to another. It actually does occur naturally and can be effected artificially in nuclear reactors and particle accelerators.

Newton also wrote the monumental tome, Principia Mathematica, but the number of his publications annually was well below average compared to our current crop of funded researchers, and most papers were not published in top-tier journals. There was even a period of 11 years during which Newton published nothing at all.

In today's world, Newton probably would have been accused by funding agencies of spreading himself too thin. Furthermore, his ideas were so beyond the mainstream that they would have neither been understood nor sanctioned by his peer critics at today's journal and grant agency panels.

Focus is on collaboration

The primary function of these review bodies is to ensure that only

focused, comprehensively detailed experimental protocols and steadily productive projects are funded, and only statistically validated data that is easily reproduced is published.

What that means, sadly, is that any proposal must be understood and approved by even the least knowledgeable panel member.

"Multidisciplinary" is a relatively recent catchword vigorously embraced by granting agencies.

No longer is there unquestioned support for the curiosity-driven research traditionally associated with individual scientists delving into their own hunches and embarking upon scientific fishing expeditions. If they collaborate with biologists, engineers and chemists, all the better. The public, government and granting agencies want more bang for the buck —multidisciplinary research that yields practical applications for the real world.

But that flies in the face of the fact that virtually every major scientific discovery, from the time of the ancient Greeks to present day, was achieved by an individual driven almost solely by curiosity.

Would the young Albert Einstein have conceived theories, ultimately confirmed by others, that space is curved, time is not constant, black holes exist, gravitational waves permeate the universe and E=mc2 had he been corralled into a collaboration with a group of scientists working on a specific, conventional research program? Einstein won a Nobel Prize for his work on the photoelectric effect.

There's an urgent need for a radical change in the philosophy and mentality of research funding bodies.

It's time to establish a mechanism that provides career investigators with

long-term, secure funding. An evaluation panel to select outstanding candidates for long-term support should be comprised of accomplished senior scientists.

In light of the ingrained policies, procedures and staffing of both university and governmental research administrations, such a reformation is unlikely to happen at any reasonable pace, if at all.

A more feasible approach would be the creation of new public foundations specifically dedicated to providing long-term, stable funding to scientists. Such foundations would allow investigators to concentrate their energies on research, not on the need to constantly validate their activities in order to qualify for renewed funding.

This article was originally published on The Conversation. Read the original article.

Provided by The Conversation