When I Heard the Learn'd Astronomer: From Natural Philosophy to Communicating the Cosmos

Opinion

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Key Words

Astronomy Communication
Two Cultures
Arts
Poetry
Literature
History

Summary

More than 50 years after C. P. Snow's Two Cultures lecture that described a chasm between literature and science, McCool & Russo look back to the source of this separation, provoking a re-examination of modern science communication.

The assumption that science can and should be shared with the public dates back only to the 19th century. Before that, scientists, then referred to as "natural philosophers", considered their work as an art that had more in common with literature than logical deduction and the scientific method. Understanding how the literary scientist of the 19th century became the 21st century grant-writing bench scientist is critical for modern science communication. Astronomy works as a perfect case study to examine how science and science communication reached its current status.

The exact philosophical and empirical methods to finding truth have changed over time. Today, scientific rigour is attached not merely to the statistical laws of quantitative research, but also with the qualitative social sciences. One can now step beyond the lab to test things, people and concepts in the field. Results are validated empirically through evaluation by external and independent peers. And the acquisition of new knowledge is a global and open-source process, blurring the boundaries between language, culture, politics and economics. It is an exciting time, to be sure, but it may surprise some people that the awesome advances of science used to have more in common with the canonical assumptions of literature.

In the early 1800s, art and science had much in common. The literary author and prose writer were just as likely to have been inspired by science and not merely by the beauty and elegance of the natural world. Periodicals and magazines featured articles on technology and science alongside fiction and poetry. Scientists who wanted to reach the general public appealed to their

audience not through dry facts, but through the arts. It was common, even necessary, for the 19th century scientist to quote from the literary canon. The sign of an educated scientist was not only the application of the scientific method, but also the knowledge and use of popular literature. An inability to invoke the assumed cultural prestige of the arts could condemn a scientist to anonymity. In the words of English poet Matthew Arnold, "literature is a large word", and science was in service to a higher realm of individual excellence.

All of this began to change in the 1830s in England. At a meeting of the British Association (today the British Association for the Advancement of Science), William Whewell proposed the term scientist to apply to one who studies the "natural world". Religion was the precursor to natural philosophy, which itself was a precursor to science. The arc from religion to natural philosophy to science describes increasing logical rigour and an ability and desire to determine causal relationships.

The split between art and science intensified with the birth of the industrial revolution. Instead of learning Latin and Greek, which was the hallmark of culture during the agricultural revolution, it became increasingly important to study engineering and science, "practical pursuits" that replaced literature and the arts. This shift underlined the change in the assumption that intelligence, cultivation and prestige had anything to do with individual human excellence. This antiquated model became increasingly irrelevant as the forces of the industrial age propelled huge advances in scientific and technological fields.

Change came quickly. Better technology, greater knowledge of the world, and refined scientific methods resulted in a fracture. Humanities and science, the two cultures, went in different directions. This happened long before C. P. Snow's influential talk, which outlined the split between the "two cultures" of society — the humanities and the sciences. When Sir William and Sir John Herschel were studying the stars, writers and painters were living among them. And perhaps one of the best ways to imagine this split, and the forthcoming need for communicators to deliver scientific knowledge, is through literature. Consider Walt Whitman's 1865 lyric poem *When I Heard the Learn'd Astronomer:*

When I heard the learn'd astronomer;
When the proofs, the figures, were ranged in columns before me;
When I was shown the charts and the diagrams, to add, divide, and measure them;
When I, sitting, heard the astronomer, where he lectured with much applause in the lecture-room,
How soon, unaccountable, I became tired and sick;
Till rising and gliding out, I wander'd off by myself,
In the mystical moist night-air, and from time to time,
Look'd up in perfect silence at the stars.

At a mechanical level, the poem is written in free verse. The writing is lean and fluid. Whitman begins the first four lines with the same word, creating a sense of continuity. After becoming "tired and sick" he ventures out into the "mystical moist night-air" to look up "at the stars". At first glance this seems like a poem about nothing more than a lecture on astronomy. Desiring more than numbers or charts or diagrams, Whitman takes to the open skies for a first-hand experience. This could be anyone's response to a technical lecture on the night skies. But the truth is more complex. Whitman wrote this verse during a period in which man, a literary ape, became scientific. And the change was difficult to absorb.

But there is something far more important going on in this poem. It is the difference between proofs and figures and the awesome power of the night sky. In 1865, the year this poem was published, Whewell's declaration that the word scientist be used for those natural philosophers who took to empirical research had already been circulating for more than three decades. Whitman's poem can be seen as a backlash against this shift in knowledge.

Whewell's declaration and Whitman's poem say a lot about both science in general and astronomy communication in particular. In the 19th century, there was no need for the science or astronomy communicator. The scientist or astronomer simply did they best they could, assuming they wanted any kind of audience, in reaching out to the general public. These people used literary magazines to share their work, an indication of their education as students of literature. But as knowledge increased, the wish to toss those values aside in favour of a new science grew irresistible.

The advances in telescope design throughout the 19th and 20th centuries resulted in continuous streams of data drawn from the sky. Better analytical and statistical techniques led to improved analysis of that data. We quickly crawled out of our little corner of the Universe to witness the vast expanse of the unknown, and it has been inspiring. Trying to communicate the awesome power of the Universe has become a challenge not only for the astronomer, but for the dedicated communicator versed in modern astronomy. As astronomers lead us into new vistas of exploration, communication becomes indispensable for sharing the expanding map of our Universe. This is of the utmost importance to a public that continues to look up, through the words of Whitman, "in perfect silence at the stars".

Further information

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Biographies

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