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Scientific journalism: Problems and perspectives

“I read in the newspaper...”, “I heard on the radio...” and “I saw on TV...” are phrases that catch our attention. In our twenty-first-century society, in which bits and neurons have replaced sooty smokestacks as the focus of industrial development, information is vital. News is the building block that helps us construct an understanding of the world we live in.

In the past few years, the amount of scientific news that fills the headlines has increased dramatically as science plays an increasingly visible role in society. Interaction between the scientific world and that of the news media is inevitable and, overall, positive, but it is also quite complicated. Many difficulties arise from the fact that these two towering pillars of modern society are very different. They each have a distinct manner of developing their own realities. The communication of scientific knowledge to the general public via mass media requires a new relationship between the world of science and that of the news media, and this relationship is still just beginning to be explored.

Although sometimes seen as such, the press, radio and television are not divine fountains of truth with an independent existence. News is a product of society. Like all other products, it is prepared by professionals. A reporter is the professional who prepares the presentation of news. The reporter must be a translator, converting information from a specialized source into something that can be understood by a more general audience that has no previous knowledge of this information.

One might think that a reporter imparts an unquestionable reality based on fact, but what is really given is a representation of what he or she wishes to be understood by the audience. The omnipresence of the media, already riddled with multiple interests, has converted the world of information from a part of a larger system into a world unto itself. This world of news establishes its own norms, images, language, and truths. News can also be tailored to serve many purposes, such as to provoke debate or to support a particular public position. Thus, the media does not simply communicate a reality; it creates one.

Mass media is a commercial product, and as such, it must play to its audience in such a way that it captures attention and

sells. This necessity converts the reporter into a kind of showman, and the news must spark debate and emotion in its audience to maintain interest. The news media, like all forms of entertainment in the media, is constantly trying to gain a larger audience. The media’s construction of reality, with the goal of reaching a large audience, does not go unnoted by groups that wish to further their own agenda. Special interest groups play an active role in the creation of news, and do their best to affect the work of a reporter in such a way that the news promotes public sympathies towards whatever cause their particular group supports. Scientists and science policy makers are becoming increasingly skilled in playing this role, and therefore must learn to work with the media.

Probability and truth

It is important to realize that scientific truth and the truth in the news media are not the same thing. Scientific truths exist in context. They exist relative to past discoveries, and are constantly subject to review and revision. There are uncertainties associated with most discoveries, but they are accepted as working theories, and as such they can be used as stepping stones to a new level of understanding. Many scientific discoveries have practical applications that help validate them, but some indicate new directions for research without any immediate application. A scientist will always say, “Today, with the information that we have here at this moment, it seems that...”.

Probabilities (unlike certainties) are not a good source of news, and consequently the scientific relationship to “the truth” is not adopted in news media. The reporter needs commanding headlines, and these require absolute truths... although they may not be as absolute as advertised. In the autonomous world of the media, the truth is black and white, clear-cut and simple. While this is appealing to the audience, it can present problems in understanding, since an event that originated outside of the media world has been translated into the reality of news media before being delivered to the general public. Often,

the result is that instead of helping the audience better understand the outside world, the news media has created a new reality that is consistent with itself at best, and often bears very little resemblance to anything outside the media.

Another important difference that separates the scientific world from that of the news media is their relationship to time. A scientific analysis of new information is not time-dependent. It does not take two or three days—it takes as long as necessary. Fresh news must be produced every day, so a reporter does not have two or three days to work on a single topic. Immediate impact characterizes the rapid pace that dominates a reporter's work. Audiovisual media is at the cutting edge of the dissemination of news, and all else must come shortly after. Once a news item has been "launched"—a metaphor that rather explicitly describes the reality of the situation—few forms of media can afford to not follow the initial impact of the latest news, whatever it may be. It is almost as if a physical phenomenon of sympathetic explosion occurs. This trend seems to be growing stronger, and it is one that is very difficult to break due to the fierce competition between different forms of communication.

It is important to note that the news media almost never follow up on yesterday's headlines, although these often turn out to be incorrect. This fact, which results from the necessity for immediate delivery of absolute truth that characterizes the world of news media, means that a large quantity of misinformation that is delivered to the general public is never corrected. Consequently, most members of the general public continue to believe that what was reported was true, and an erroneous understanding of the world is constructed.

The increased coverage of scientific, medical and technological information in the media has developed in parallel with a growing public interest in these issues, particularly those related to personal and public health. Unreasonable expectations are often generated from the combination of the omnipresence of the news media together with the large number of scientific medical studies that fill professional journals, as well as concern for one's health and that of loved ones. Unrealistic expectations can distort the formation of public opinion and the public culture of health and science. Distortion and misinformation also result from information being presented without perspective or context. A clear example of this is the way the news media have treated advances in genetic research. Many studies are continually appearing about the discovery of "the gene for..." everything from degenerative diseases to a propensity towards violence. When this information is delivered to the public, it can not only create false expectations of a "cure", but it can also trivialize scientific discoveries.

How scientific news is produced

It is important to remember that the process of news production is anything but scientific. A newspaper is built on a rigid

hierarchy. Reporters are at the bottom of the pyramid, and they are the people who tend to specialize in certain areas. All news items are submitted to review at various levels, and step-by-step decisions are made about what will be included and what will make the front page. This daily process is traditional in the press, and a similar practice exists in audiovisual media, where the competition for space is transformed into a competition for time.

It is easy to see that many factors can affect decision-making in this system. Every section editor tends to assign a value to certain types of news, and the experience and specialization of the reporters also play a role in what is selected. Another important factor is what other news sources are paying attention to. This has a global effect, and explains why newspapers from different countries and cultures around the world tend to publish similar news items.

Newspapers tend to group news into sections defined either by physical geography (international, national, etc.) or theme (culture, sports, etc.). Still, there is often a section that contains news of all sorts. It is normally in this section where scientific and medical news appears, along with other things such as cultural and social events, environmental news, and an assortment of other topics that do not have their own specific section in the paper. This means that scientific news competes for space, or time, with a wide variety of other types of news. To win this competition for space and time, the reporter must find scientific news that can be presented in such a way that it will catch the editor's eye. The reporter is obliged to find, or create, headlines that will sell. It is well known that what sells is "sensational" news, whether scientific or not. So reporters must present science in a way that captures the imagination and stirs up emotions in the same way as environmental catastrophes, family dramas and murders, since these are the other news items competing for the same space. Because of this, most of the scientific news that appears is filled with killer bacteria and miraculous therapies. Even in more serious newspapers this propensity towards dramatization—not to be confused with vulgar sensationalism—is detectable.

Judging the value of scientific news and giving it appropriate headlines can be difficult. Although a reporter tends to specialize, the section editor normally lacks this specialization. Together they must find a way to present science news. Because of the discrepancy in their specialization, this usually is not easy. The result is often massive amounts of misrepresented information, which not only makes the reporting look careless but also tends to raise the expectations of the general public unreasonably.

Most science news still competes for space in the traditional manner, but as public interest in science increased throughout the 1970s and 1980s, some newspapers created sections especially for science news. Once allowed its own space, it would no longer need to compete with other sorts of news. On November 14, 1978 the *New York Times* (New York, United States), a towering example of journalism that acts as a standard

for newspapers worldwide, created a weekly section called the "Science Times". Similar features appeared in major newspapers throughout the western world. *La Vanguardia* (Barcelona, Spain) created a weekly section called "Science and Medicine" that first appeared on October 10, 1982. It expanded from a weekly four-page section to a twenty-four-page Saturday supplement, which was later canceled for business reasons. Today, most major European newspapers have sections devoted to science and medicine, some in the form of weekly supplements, and others as a daily page devoted to "Science and Medicine" or "Science and Health".

The growing practice of devoting space to scientific news illustrates an important advance in the way that the news media treat science and medicine. While the growing attention to science by the media is a positive step, there exists a danger that, in this process, scientific progress will be trivialized. The importance of a discovery is not evaluated in the same way in the lay press as in the scientific world, nor are all scientific observations reported at the time that they are discovered. On the other hand, discoveries and observations of little relevance may be published on the front page if they will appear spectacular to the general public. Consequently, major discoveries can go nearly unnoticed by the general news media and are soon forgotten by the general public, while less relevant observations might capture the world's attention.

The impact of press releases

As the news media have fostered a growing interest in scientific and medical news, scientists and physicians have had to learn to work with the media. They now play an active role in the creation of scientific news. For example, at scientific and medical conferences, it is increasingly common to have some attention devoted to the press. Research results are often delivered directly to the news media, frequently before they have been published in a professional journal. This practice is not in keeping with the standards of traditional scientific communication, and has caused more than a few difficulties.

Before scientific news became such a popular feature, well-practiced scientific reporting consisted of drawing information from professional journals, primarily *Nature*, *Science*, *The Lancet* and *The New England Journal of Medicine*. The rigorous review system used by these journals assured reporters that these sources provided reliable, thoroughly-researched information.

Due to the heavy reliance of the news media on these sources, journals began to send out weekly press releases to accredited reporters. The purpose of this practice is to give reporters time to develop news items on findings that would soon appear in scientific journals, although the lay media cannot report these items until they have appeared in the journal. Press releases not only assist reporters in preparing news items, but they also reflect a certain rivalry between scientific journals

that compete for citation in the mass media as well as for the scientific authority and social prestige that follow. Science reporters are coming to rely more and more heavily on scientific journals as sources. They have become the international press agencies of scientific news, providing scientific news in a manner similar to that of international press agencies (Reuters, France Press, Associated Press, EFE, etc) that provide general information.

The top places in the *Science Citation Index* are occupied by publications that are almost unknown outside of highly specialized fields. These journals are heavily consulted by scientists who work in particular fields, but very few people outside that specialty ever read them. Despite their unquestionable quality and importance, reporters do not consult them. One clear reason is that these journals do not publish press releases. There are also other factors that make journals that are ranked higher in the *Science Citation Index* more useful to reporters. One is that more "popular" journals, such as *Science* and *Nature*, are more general and cover a diverse array of scientific topics. They also tend to offer fewer review articles, which do not offer "news" in the sense of novelty, a quality that reporters find very useful in selling news.

When news media are analyzed, emphasis is often placed on *how* news is reported and not on *what* news is reported. The selection of news is fundamental because that is how the media directs the public opinion of what is "important". Issues become "important" by attracting attention via the mass media, not because they are intrinsically more relevant in terms of the advancement of science or social applications.

Communication between the scientific world and the media is the first step in the difficult process of transforming scientific discourse into public knowledge. To begin with, the title of a scientific article, not to mention the text, are usually far too complex for the common reader. A press release simplifies the information and interprets it in a context that transforms it into news.

The reliability of the source

Obviously, the reliability of the source is an issue that cannot be overlooked in an analysis of the production of scientific news. If a Nobel Prize winner makes a statement—whether it pertains to his or her field of study or not—it will be widely accepted by reporters, even without validation. Some institutions and organizations carry this same degree of authority, despite the fact that their reports may be biased by various interests, or might be delivered in a way designed to meet certain needs. This aura of unquestionable authority that surrounds some sources can lead to serious problems of misinformation.

One such example began with a press release from NASA on August 7, 1996. It was so exciting that it circled the world in seconds: "Meteorite shows life on ancient Mars". For the

first time in history, there was scientific proof that extraterrestrial life existed. The press release was clear. An ancient Martian rock had fallen to earth as a meteorite, and within this rock scientists had found the first organic molecules that could be of Martian origin. It contained various mineral features characteristic of biological activity and possible primitive microscopic fossils that resembled bacteria. This fascinating news was presented in the August 16, 1996 issue of *Science*.

A powerful and respected source had revealed impressive findings and it rapidly became front-page news worldwide. There were some questionable aspects, but these were pointed out by very few reporters. First, the news had appeared in a press release before it appeared in the research journal. Second, NASA was in the middle of budget negotiations. These facts aroused the suspicion of those who knew the golden rule of science reporting: apparently spectacular scientific advances must always be put in context and perspective. After the initial excitement wore off, more journalists and scientists began to voice their doubts, and the August 16 issue of *Science* revealed even more questions about NASA's breakthrough discovery.

In the January 16, 1998 issue of *Science*, another article appeared explaining how the famous Martian rock might have been contaminated by terrestrial organic molecular fossils. This second *Science* article about the Martian rock did not make any headlines. The mass media that had so enthusiastically

embraced the first news item completely ignored the follow-up. So what did the general public remember? Naturally, the first item, which had made international headlines: that NASA had found the first signs of extraterrestrial life in a meteorite in Antarctica. This is how misconceptions are formed about the world in which we live.

Regardless of problems within the scientific community, this example shows what happens almost daily when mass media misrepresents scientific news. This misrepresentation results from a number of factors, particularly from a tendency to sensationalize news, a lack of analysis and perspective when handling scientific issues, excessive reliance on certain professional journals for the selection of news, lack of criticism of powerful sources, and lack of criteria for evaluating information. Of course, not all general news sources make the same mistakes, but the most common errors occur far too frequently.

Since most public knowledge is derived from the mass media, it is easy to see why the general public tends to be poorly informed about scientific issues. The reporting of science news via the mass media is anything but easy, but it is becoming increasingly important. Fortunately, both journalists and researchers are realizing that their fields are becoming increasingly intertwined, and are exploring new ways to work together. The evolution of this partnership is likely to be fruitful.

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