ASTRONOMY, NEW INSTRUMENTATION, AND THE NEWS MEDIA

Stephen P. Maran
Space Sciences Directorate
NASA's Goddard Space Flight Center
Code 600
Greenbelt, MD 20771

To appear in

Proceedings,
Symposium on Astronomical Instrumentation and the Growth and Birth of Astrophysics,
San Francisco, Astronomical Society of the Pacific, 2001,
in press

ASTRONOMY, NEW INSTRUMENTATION, AND THE NEWS MEDIA

Stephen P. Maran
Space Sciences Directorate
NASA's Goddard Space Flight Center
Code 600
Greenbelt, MD 20771

1. ROBERT TULL AND THE TULL SCANNER

In 1959, I moved from New York City to Ann Arbor to attend graduate school and had the pleasure of first meeting Bob Tull. We were graduate students together and Tull's work enabled my eventual doctoral dissertation. For his Ph.D. thesis he built what became known as the Tull Scanner, one of the few photoelectric spectral scanners in regular operation on a telescope in the early 1960s. Then our fellow student, Peter B. Boyce, did his own thesis on the Rosette nebula with the instrument. The Tull Scanner was badly in need of a user's manual, but Tull did not provide one, since he already knew how to use it. Fortunately, Boyce showed me how to install a new roll of paper in the chart recorder when necessary, how to put ink in its pen, and how to chop up a mass of dry ice with an ice pick before you shoved it in the compartment around the photomultiplier tube, as otherwise the refrigerant would not fit. These are all technologies as unknown to most present-day graduate students as the mimeograph machine, the planimeter, and the abacus.

Next, I did my own thesis with the Tull Scanner, on Nova Herculis 1963. At the time, it was not generally understood that novae are binary systems. Robert Kraft had reported a few old novae as binary, but the clear distinction in physical mechanism and evolutionary state between novae and supernovae, and the concept of the cataclysmic variable star, were not the paradigms that they are today. It was likewise the era when Harlan Smith was in the midst of expanding programs at the McDonald Observatory. It was one of Smith's many visionary acts that he recognized Bob Tull's potential, as demonstrated by the Tull Scanner. Smith recruited Tull for the McDonald staff. The subsequent decades of instrumental innovation and accomplishments by Bob Tull are what we are gathered here to celebrate.

2. ASTRONOMY AND THE NEWS MEDIA

In the early 1960s, reporters only called the University of Michigan Astronomy Department when a bright aurora hovered overhead, or folks around the state reported seeing a bright fireball or bolide. Nowadays, astronomy and astrophysics are always in the news, thanks in part to the spectacular discoveries enabled by new telescopes and instruments. The larger observatories, notably including McDonald Observatory, offer informational and outreach services to a growing audience. A substantial media services activity has evolved at the American Astronomical Society (AAS) in tandem with the

growth of astronomy and space science coverage in the mass media. This experience has taught us many useful lessons as astronomers and other scientists increasingly appreciate that the heavy government support of our fields might depend on and in any case certainly merits conscientious efforts to keep the public informed of what we are doing and learning.

One of the programs that we developed at the AAS is a press release distribution service that currently serves about 1300 members of the print, broadcast, and Internet media who have astronomy and space science on their beat. Universities, observatories, government agencies, scientific societies, etc., send us their press releases and we forward them at no cost to the subscribing journalists or to the originators. A breakdown of the material distributed by this service in one recent period illustrates the level of activity by various types of organization, as reflected in 64 press releases distributed by the AAS over the period of a month (28 February – 29 March 2000).

As seen in Table 1, 33 of the press releases came from NASA –either from NASA Headquarters, a NASA field Center, or a laboratory conducting most or much of its research for NASA. In contrast, only five releases came from the National Science Foundation or its national observatories. It goes without saying that NSF's contributions to astronomy are much greater than these numbers suggest, so NSF may need to do more to make its contributions known in the media. Since the time represented by the data in Table 1, the national observatories have added additional press officers, and certainly this will help.

TABLE 1

SOURCES OF 64 PRESS RELEASES DISTRIBUTED BY THE AAS DURING 28 FEBRUARY 28 – 29 MARCH 2000

NASA Headquarters	20
NASA, NASA-Related Centers (ARC, GSFC, JPL, APL, CXRC, STScI)	16
NSF	1
NSF National Observatories (NOAO, NRAQO)	2
Scientific Societies (AGU, RAS)	5
Foreign Observatories (CFHT, ESO, NAOJ, ST-ECF)	5
Universities	14
Foundations	1
Astronomical Magazines	1

It's sometimes suggested that NASA goes overboard in publicizing its programs, or in representing developments in the most positive sense. One is reminded of the widely circulated cartoon in which a television correspondent standing near a launch pad on which the Space Shuttle is upside down, reports that officials say they have delayed the launch due to a "technical problem." Another humorous drawing shows a visitor who wandered into what appears to be an enormous space operations center, reminiscent of the one that directed the Apollo moon missions. He's in search of Mission Control, but a console operator advises him that "this is spin control." These are strong exaggerations in the interest of poking fun, and one can respond that the end result of the heavy publicity for NASA astronomy programs like the Hubble Space Telescope is that millions of people, many children and students among them, have become exposed to and interested in the results of space astronomy and space exploration. It would be wonderful if all kids studied hard, learned all that their textbooks contained, and fully absorbed their school lessons. Unfortunately, studies show that Americans are more likely to gather their information from television and other mass media than in any other way. Constructive publicity for astronomers' discoveries inspires students to learn science and mathematics, interests a significant fraction of the general public, and helps to develop a better-informed citizenry.

There's been major growth in coverage of astronomy in the news media in recent years, helped no doubt by the great public interest in the Hubble Space Telescope and the space probes that have made the rounds of the solar system. But strong interest in our field has been there for a long time. Eight decades ago, the pace was slower –it might take several days for an account of new findings at an AAS meeting to appear in *The New York Times*, but it did appear, and sometimes on the front page (Maran 1999).

Several centuries ago, astronomers could not rely on mass media to get their findings known, so they often published them themselves. In fact, astronomers took the lead among scientists in this respect. In the 16th century, Tycho Brahe operated two astronomical observatories, each with its own printing press. One of them is said to have been the world's first scientific press (Christianson 1999). Today astronomers are still pushing the state of the art to disseminate their findings. The new Hayden Planetarium at the American Museum of Natural History in New York City has developed "Astro Bulletins" that are high-definition television versions of the more familiar video walls. This service is regularly updated based on press releases, images and video originating with many organizations. There are plans to feed it to other museums around the USA. At AAS meetings, reporters connect their portable computers to an Internet hub in the Press Room, and file stories as soon as they write them (Figure 1).

3. SCIENTISTS' ATTITUDES TOWARDS THE NEWS MEDIA

Despite the wide current interest in disseminating astronomy news through the media, there is still a feeling on the part of some scientists that dealing with the press is fraught with danger or even "unclean." You might damage your reputation among other scientists if quoted incorrectly, quoted out of context, or even if you simply are quoted

Figure 1. Journalists file news stories via an Internet hub in the Press Room at an American Astronomical Society meeting. (AAS photograph by Richard Dreiser, © American Astronomical Society 2001.)

"too often." Some scientists want to deal with journalists only if they can control what the reporters write. That's contrary to the objectives and ethics of the journalism profession. Reporters are not supposed to write what you say, but what they conclude and believe after interviewing you and checking with other sources.

A dim view of journalism did not originate with modern scientists. Charles Dickens wrote in 1842 that American newspapers and magazines "are so filthy and bestial that no honest man would admit one into his house for a water-closet doormat." But journalists (even if Dickens' view were valid when written) are people that astronomers cannot ignore. You may not be able to live with them, but as the saying goes, you can't live without them. The taxpayers and public leaders want and need to know what government-supported researchers are doing, and journalists are the intermediary force that provides this information. Mark Twain asserted that "There are only two forces that

can carry light to all corners of the globe... the sun in the heavens and the Associated Press down here." Further, an increasing proportion of the science writers active in the news media today are professionally trained in their craft. Many have science backgrounds as well. Don't confuse the specialist science writers with the occasional cub reporter or general assignment newspaper writer who calls a scientist with questions so elementary that it is clear the reporter is wholly ignorant of the subject matter and the expert may despair of successfully explaining it.

The press officer of the Smithsonian Astrophysical Observatory recently complained that "scientific results are increasingly being disseminated (or distributed) with the same techniques and intensity used to market other products – say, disposable diapers, razor blades, and toothpaste" (Cornell 1999). This criticism, if valid, applies of course to the institutions that originate science stories, not to the news media that report it. Yet if modern marketing techniques are successful in getting the above-named hygienic and personal care products into millions of homes, why do any less for the exciting news of science? I'm glad that so many of my fellow citizens, wash, shampoo, and brush their teeth every day and I wish them a daily dose of astronomy news as well.

If current scientific findings are not aggressively promoted to the news media, few people will be aware of them, yet many students and others might appreciate or even benefit from the information. Media reporting makes events real to people. I'm reminded of the cartoon that appeared in *Physics Today* recently: In a twist on Heisenberg's famous Principle, a team of physicists has discovered that the existence of an electron is uncertain, so that its actual location remains unknown until it is reported in the news media.

Aggressive marketing is necessary for science news, because there's a great competition for space in the newspapers. A good astronomy story should interest people widely, but few US newspapers have a "national" orientation, with science writers empowered to report regularly on results from beyond their home regions. (The national papers include *The New York Times, Washington Post, Dallas Morning News, Boston Globe,* and the *Los Angeles Times*, all of which regularly send reporters to cover AAS meetings.) For a science story to run in many of the hundreds of other US newspapers that don't take this approach, it must be transmitted by one of the major wire services, such as the Associated Press and Reuters, or be picked up by regional newspapers from the individual services of the national papers.

4. FINDING SPACE FOR ASTRONOMY IN THE MEDIA

A daily newspaper is filled with advertisements, cartoons, editorials, articles by columnists and other syndicated features, etc. What's left is called the "news hole." Science news is in competition with many other types of news for the limited space in the news hole. And the news of astronomy is in competition with news of all the other scientific fields for the small part of the news hole that is sometimes available for science news.

Table 2 illustrates the limitations on space available for reporting science in a national newspaper, here the *Washington Post*. It's just one chart from several prepared in an earlier analysis we did of a representative issue, for October 22, 1997. In the *Post*, science news appears in the "Nation" section, and the science reporters work for the National desk. The contents of the section fall into 27 categories, from advertisements to White House news, most of which are represented in the newspaper on a daily basis, or nearly so. Physical Science news, which did appear in the *Post* issue that we studied, of course appears less often. On the date we studied, the *Post's* science writers published two science stories, one on medical science and one on astrophysics. The "Education news" on October 22, 1997 happened to be science-related, on "U.S. Students Do Poorly in Science Test." Perhaps the students would have done better if they and their teachers were exposed to more science news in the mass media. This was an above-average day for science in the *Post*, but the newspapers' readers deserve much better.

There's also substantial competition between different science stories on any given day for the small part of the news hole that may be available to science. A NASA press conference on November 7, 1997 presented a new discovery in the physics of the Sun, from the SOHO satellite. But that report was up against a press release issued on the same day by the University of Michigan, on another solar discovery. And many if not most media that might have covered the NASA Sun story instead covered a medical science press conference announcement by the National Institutes of Health, on acupuncture. (This was not just a competition for space in the news hole, but also for reporters' attention. At least one major news agency science writer was responsible for both the NIH and NASA stories; she was only able to cover NIH that day.) Further competition came from another part of NASA, which issued a press release on the discovery by the Galileo space probe of an Arizona-sized lava flow on Io. The CNN Science Unit, which often reports on NASA's Washington press conferences, was in Colorado on November 7, preparing to cover the next-day's announcement (at the AAS High Energy Astrophysics Division meeting) on the possible detection of relativistic frame dragging in black hole binary systems by the RXTE satellite.

For a brief period in the late 1990s, a great deal of astronomy news was being reported on the World Wide Web. News providers such as ABCNews.com, MSNBC.com, and Space.com regularly sent reporters to cover AAS and other scientific meetings. They also published many astronomy stories at other times. All or most such organizations have since cut back on their reporting staffs. They run fewer stories now, and write less of them in-house. A new trend is for the print reporters of major newspapers such as the *Washington Post* to file their stories on astronomy on their websites before the same stories appear in the newspaper. The consumer is getting science news faster, but less of it, with fewer voices reporting.

TABLE 2

Contents of the Washington Post, "Nation" Section, October 22, 1997

Congressional news
Crime and Police stories (national)
Editorial Cartoon
Editorials
Education news
Environmental news (national)
Environmental policy news
Federal Page (featuring on this date the FBI and CIA)
For the Record column (quotes of the day, generally by public figures)
In the Loop column (government employees/officials gossip items)
Internal Revenue Service news
Labor news
Letters to the Editor
Local news*
Masthead (identifies editors, etc.)
Medical Science news
Military news
NATO news
Op Ed page
Physical Science news
Political news
Quality of Life news
Race Relations news
Quality of Life news
State Department news
Table of Contents
White House news

*Some of the more important local news items appear in the front section of the newspaper, while most appear in the "Metro" section.

The problem of getting news of astronomy on television is similar. There's limited time available on network and local news programs, and strong competition for that time. In addition, there are very few qualified (or even unqualified) science correspondents on U.S. television news staffs. One major network has a Chief Science Correspondent who mostly covers medical news and no other specialist science correspondent. Another has a Science Editor who mostly reports exclusive stories, meaning stories that deliberately omit the public announcements of scientists and their institutions in favor of other information. CNN is almost unique among American networks in having a dedicated Science Unit, with specialist science producers and correspondents. When the number of television channels available to US consumers was greatly increased through cable and satellite TV services, it was thought that the amount of science available to viewers would increase, but there was little increase. The great majority of the new channels are commercial entities that are just as ratings-driven as the commercial broadcast networks. Reruns of old sit-coms are presumed to earn higher ratings (and thus higher advertising revenue) than science news.

4. FACILITATING MEDIA COVERAGE OF ASTRONOMY

The AAS has adopted, adapted, or developed several practices to facilitate media coverage of astronomy findings reported at our national meetings (Maran, Cominsky and Marschall 2000). Months before each meeting, two press officers read through the many hundreds of abstracts submitted for the program. We then send dozens of letters, inviting the authors of meeting papers to participate in the press activities at the meeting by

- Speaking in a press conference
- Lecturing at a seminar for science writers
- Appearing in a "photo opportunity"

or by furnishing any or all of

- A printed press release
- A photo release
- A video news release and/or "B-roll"

(A photo opportunity is an event in which one or two scientists are on hand with some interesting equipment or unusual display at a defined time when wire service and television photographers can come and record the occasion. "B-roll" consists of videotape of background information relevant to reporting a news story. For example, when a discovery by the Very Large Array is announced, B-roll would consist of video tape with an aerial view of the Array and scenes of scientists at work in its control center.)

We send detailed guidelines for how to write a press release, and suggestions on how to organize and present remarks at a press conference. We also encourage astronomers to

think of demonstrations or "props" that they can use in explaining their findings to the media. Finally, where possible, we arrange press tours of novel or historic astronomical facilities in the region where the AAS meeting is held.

Figure 2 shows a typical press conference at an AAS meeting. Figure 3 illustrates a particularly effective use of props by astronomers in a press conference at a Texas Symposium on Relativistic Astrophysics.

Figure 2. A panel of astronomers briefed the press on intermediate-mass black holes at an AAS meeting. (AAS photograph by Richard Dreiser, © American Astronomical Society 2001.)

5. WHAT CONSTITUTES "SCIENCE NEWS?"

In selecting press release and especially, press conference, topics, we are guided by a sense of "What is news?" That's not quite the same as "What is scientifically significant?" although the two sets are not exclusive. In short, "science news" is what reporters and editors are willing to write and publish. In the case of a field such as astronomy, where few discoveries are closely coupled to people's daily lives (unlike, say

Figure 3. Peter Höflich and J. Craig Wheeler used a hula hoop, a bread stick, and a bagel to explain a model for the circumstellar material around SN1987A. The occasion was a press conference at a Texas Symposium on Relativistic Astrophysics, in Austin. (Photograph by Tom Siegfried, © *The Dallas Morning News* 2000).

medical or environmental research, and sometimes excepting of news of solar activity), there is a working consensus among journalists that superlatives make news. You have ready access to the media if you've found the biggest star, the furthest quasar, the nearest black hole, or you've built the largest telescope, or the one that gives the most spectacular views. In addition, at any given time there seem to be a small subset of astronomy fields with built-in news value. John Noble Wilford, the Pulitzer Prize-winning science writer of *The New York Times*, told a recent AAS meeting in Austin that there are a handful of topics that he and his fellow reporters cover regularly. He mentioned that these include dark matter, black holes, the Big Bang (meaning new cosmology developments), and extrasolar planets. We find it much harder to gain coverage for topics such spectral atlases or theoretical astrophysics, for example, than for those Wilford mentioned, although the results may be of equal significance, or greater, in any given case. Of course, there are occasional exceptions.

The press often perceives and portrays scientific research differently than scientists do. We think of most science, including much of the best work, as incremental. That's why

we require full referencing of prior work in a scientific paper. But the press portrays science as a series of quantum leaps. If a reporter doesn't describe new findings as a great advance, his or her editor will conclude that the results are unimportant, and the editor may kill the story. For the scientific literature, results have to be new. But for the popular press, a science news story often has to be presented as a "breakthrough."

When astronomers understand the different principles that guide the work of journalists, as opposed to those of scientists, we can work more effectively to facilitate and encourage the widespread reporting of our field.

REFERENCES

Christianson, J. R. 1999, *On Tycho's Island: Tycho Brahe and His Assistants, 1570-1601*, Cambridge University Press.

Cornell, J. 1999, Retailing Astronomy: One More Hard Sell in the Marketplace?" *ScienceWriters*, Summer 1999, p.7.

Maran, S. P. 1999, The American Astronomical Society and the Mass Media, in D. H. DeVorkin, ed., *The American Astronomical Society's First Century*, American Astronomical Society, p.213.

Maran, S. P., Cominsky, L. R., and Marschall, L. A. 2000, Astronomy and the News Media, in A. Heck, Ed., *Information Handling in Astronomy*, Dordrecht: Kluwer, p.13.