Statistics, Science and Public Policy: Shifts in Culture

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ABSTRACT

In 1999, approximately 40 leading scientists, statisticians, public science administrators, and journalists were invited to Herstmonceaux Castle in Hailsham, England for the fourth conference on Statistics, Science, and Public Policy. The theme of this conference was "The Two Cultures?" in recognition of the fortieth anniversary of C.P. Snow's famous Rede Lecture where the growing gulf between the traditional culture of the arts and the humanities and the newer culture of science was first identified.
The papers presented in this technical report are the written versions of two talks. The first is that presented by R.W. Oldford in a session devoted to "The University Culture". The second, by M.E. Thompson, was presented in a session entitled "Science and the Public Purse".
These papers, prepared in concert for the conference, took issue with the identification of distinct cultures and instead chose to concentrate on drawing attention to the ways in which intellectual culture has shifts and the effects these shifts have on the role of the members of the university and on the public support given to research.

Cultural shifts:
Humanities to science to computation

R.W. Oldford

Summary

It is argued here that the essential phenomenon of import which C.P. Snow described in 1959 as that of two distinct non-communicating cultures – one of 'literary intellectuals' one of 'scientific intellectuals' – is better described as a shift in emphasis within the university culture from a *humanities dominated* one to a *science dominated* one.

Society in general and university students in particular actively participated in this shift. The natural reaction of the student body is to pursue perceived opportunity. The university culture reacted in a lurch from one dominating group to another. The consequent detrimental effect on the humanities at the universities has been regularly argued with passion in the forty years since Snow's lecture.

There is now some evidence that another cultural shift is taking place or, in the language of Snow, that a third culture is growing to stand beside the other two. Unlike Snow's vision of a third culture, this one is technologically based and cares little about bridging any perceived gap between the other two.

This new shift presents significant challenges to the natural sciences not unlike those presented to the humanities at the last significant shift. Ignore it and the cost to the natural sciences could be great; recognize it and it could be significantly accommodated. Either way, there should be a renewed urgency in the university culture to ask the perennial question of what constitutes a well-educated citzenry.

Shift in culture

In 1959, Snow was writing at a time when the 'scientific culture' was ascendant and enjoying great popularity. The twentieth century was a new age of enlightenment likened to that of the Elizabethan, with Rutherford as Shakespeare.

Although the twentieth century, and particularly the times between and after the two world wars, had been very good to science, it was not so good to the letters. George Orwell wrote "The literature of liberalism is coming to an end. As for the writer, he is . . . merely an anachronism, a hangover from the Bourgeois age, . . . from now onwards the all important fact for the creative writer is going to be that this is not a writer's world."[1] Overstated perhaps, but it does convey the widely held sentiment that it was a better time to start a scientific career than a literary one.[2]

For the most part Snow's essay on the 'Two Cultures' was directed at the 'other culture' – the older, established culture of the literary intellectual. Just look at the tests he applies. It is hard to imagine, even now, that any native English speaking scientist could have made it through secondary school without having read at least one play of Shakespeare (and Shaw, and Ibsen, and Chekhov, ...); but it is still debatable whether a non-scientist should know the second law of thermodynamics (at least as *The Second Law of Thermodynamics*). A somewhat comparable literary challenge might be having read and appreciated Horace or Cicero.

Perhaps the most telling sign of this one-sidedness is that scientists, for the most part, seem to agree with Snow's assessment while humanists have been quite dismissive of Snow's 'superficial' and even 'silly' dichotomy.[3] Snow's 'scientific culture', feeling its youthful strength and insecurity, wants recognition from the established 'intellectuals'. To me, this seems to be more symptomatic of a shift than of a separation.

In his rebuttal to critics, written four years after the Rede lecture, Snow struggles to defend his choice of the word culture and of the number two. Parenthetically he remarks that "No one, I think, has yet complained about the definite article."

The choice of 'culture' is defended by appealing to a dictionary definition meaning "intellectual development, development of the mind" and also to the anthropological distinction made between living groups of people. Were he to adopt a definition from Coleridge of culture being those 'qualities and faculties which characterise our humanity', Snow admits that neither the literary nor the scientific constitute cultures but rather sub-cultures. In this light, the cultural shift is one of emphasis. In Snow's view, too long has our culture nurtured the literary and starved the scientific. Snow is interested in having the balance redressed.

Accepting Snow's choice of the word culture, it is easy to see that the number two could be many more. Every specialization could be called a culture. Indeed, in the forty years that has passed since the Rede lecture, sufficient has been written on Snow's 'Two Cultures' that it might legitimately constitute a specialization of its own – a humbling thought for those of us here who have been asked to address the matter for the first time.

Snow defends the number 'two' on grounds of simplicity – it crystallizes the two extremes for contrast. It is interesting that Snow briefly considers three by the possible separation of technology from science. He dismisses it because he has observed that the technologist, when designing a new technology, goes through much the same experience as a scientist in designing an experiment. To this I feel compelled to add the words of the professional chemist, Primo Levi, whose fame is established as a writer. They should evoke kindred feelings from any theoretician:

> ...I now felt in the writing a complex, intense, and new pleasure, similar to that I felt as a student when penetrating the solemn order of differential calculus. It

[1] Quoted from de la Mothe, p. 34.
[2] This case is convincingly made by de la Mothe.
[3] E.g. Allan Bloom, Russell Kirk, F.R. Leavis, Northrop Frye.

> was exalting to search and find, or create, the right word, that is, commensurate, concise, and strong; to dredge up events from my memory and describe them with the greatest rigour and the least clutter."
>
> From *The Periodic Table*, 1975, p. 160.

A more understandable justification would be that technology has so long been tied up with science that its separation seems unnatural to Snow.

One thing that the number two has resulted in is an entire cottage industry devoted to finding number three. Snow himself started this. Although 'technology' was rejected, in his rebuttal to his critics he did introduce what he saw to be the beginnings of a third culture. This third culture was being formed by the social sciences, in Snow's words those

> "...intellectual persons in a variety of fields – social history, sociology, demography, political science, economics, government (in the American sense), psychology, medicine, and social arts such as architecture. ...All of them are concerned with how human beings are living or have lived – and concerned, not in terms of legend, but of fact.
>
> page 70 of *The Two Cultures* second edition.

Allan Bloom, in his 1987 book *The Closing of the American Mind*, identifies the big three disciplines which "rule the academic roost and determine what is knowledge" (p. 356). These are the natural sciences, which are doing well, the social sciences which are more robust being more in harmony with the natural sciences although in Bloom's opinion they only succeed in "aping ... the methods of natural science" (p. 358), and the humanities which are languishing having decided "to proudly set up shop next door" rather than to "humbly find a place at [the] court" of natural science (p. 358). The shift from Snow's view of the cultural problems to Bloom's is staggering.

Snow thought that when this third culture came into existence it would serve to ease communication between the two cultures. This was because this third culture would have to "be on speaking terms with the scientific one ...just to do its job." Perhaps it has but, if Bloom is correct, the communication sadly ended there.

More recently, John Brockman and others have seized on the communication between science and others as the hallmark of the third culture. His third culture consists of scientific thinkers who are able to communicate directly with the lay public. These include well known scientists like Richard Dawkins, Stephen Jay Gould, and Roger Penrose, and well known computer scientists like Daniel Hillis and Marvin Minsky.

The primary medium for discourse seems to be the internet where articles and follow up commentary are posted to open discussion groups. (The principal web site is www.edge.org/3rd_culture.) Whereas early scientists, at least as early as Archimedes, exchanged their ideas in letters written to other scientists, challenging them to think on them, this third culture purports to replicate the exchange but with a much larger collection of thinkers (scientists and the lay alike). The writers and commentators are the third culture, a culture of individuals whose ideas are reviewed by the public rather than by more traditional (and likely more conservative) peer system. Brockman writes

> "Unlike previous intellectual pursuits, the achievements of the third culture are not the marginal disputes of a quarrelsome mandarin class: They will affect the lives of everybody on the planet."

Heady stuff. Absent the internet, and so the immediacy of discussion, and this is just a bunch of scientists, albeit articulate ones, trying to communicate to the lay public. Nothing new to that.

In fact Snow had been quick in his rebuttal to point out the existence of such writers as J. Bronowski, G.H. Hardy, and A.N. Whitehead who in "some of the most beautiful prose of our time" (p. 63) wrote directly for public consumption. But this is not a third culture in Snow's view, simply additional evidence that science is deserving of the word 'culture'.

Scientists, curiously, have often not been kind to other scientists writing for the lay public, particularly if it is found to be promoting a pet theory. An early example is Descartes's biting review of Galileo's famous book, the "Two New Sciences":

> "... his fashion of writing in dialogues, where he introduces three persons who do nothing but exalt each of his inventions in turn, greatly assists in [over]pricing his merchandise."
>
> In a letter to the great experimental scientist Marin Mersenne (1588-1647), dated 11 October 1638 ...from Stillman Drake's translation, 1975, p. 388.

One is reminded of the current and much more public disagreement between Gould and Dawkins where one worries publicly that the other writes perhaps too well.

A more interesting, and to me much more plausible, candidate for a third culture is the one rejected by Snow, namely, technology. Not technology as Snow understood it in 1963. Far too much has changed since. And not that of the specialized technology expressly designed to address scientific questions. The critical technology here is the general purpose computer which now appears in schools and homes throughout every industrial society.

The ubiquity of this extremely malleable technology together with the instantaneous worldwide communication between its users has enabled the growth of what Kevin Kelly, the executive editor of *Wired* magazine, has called the 'nerd culture'.

Kelly coined the term last year in an essay in *Science*. There he described the nerd culture as an outgrowth of science but one which is quite separate from Snow's two cultures.

- The nerd culture pursues neither understanding of the natural world nor of the human condition; it pursues novelty.
- Questions are framed so that the answer is a new technology.
- It creates possibilities.
- Creation is preferred to creativity.

According to Kelly:

> The culture of science, so long in the shadow of the culture of art, now has another orientation to contend with, one grown from its own rib.

If Kelly is right, our culture is shifting in an important way again. This time in a direction which might affect science more than the humanities.

The student

Imagine a student now entering university. The 'nerd culture' is part of his or her culture. It could not be otherwise. What does this student expect of a university education? What do we expect of this student?

It is a time honoured tradition in academe to lament that students are not what they once were. But this just isn't true in any important way. In terms of intelligence and motivation little has changed since ancient Greece.

Students have always enjoyed, and will always enjoy, the contemplative and the puzzling. And, they have always been, and will always be, interested in personal gain – whether financial, or affiliation with an elite, or fame, or power for its own sake. It is no accident, for example, that students appearing in the Platonic dialogues are intent on honing their rhetorical and dialectical skills so as to acquire and wield political power. Nor is it coincidence that the elite of Athenian society would charge Socrates not just with impiety but also with the corruption of their youth. One can imagine the appeal of a classical education to a youth in classical times.

Our principal means to give meaningful power to students is through specialization. Acquiring some mastery of a subject requires spending considerable time immersed in it, exploring a terrain so well that it not only becomes familiar but that one can at least imagine how it might be extended into new territory. This is an intellectual power that every educated person should experience. Even so, a specialization which cannot assure the student a certain success in society after graduation will be avoided, if not shunned.

Natural science might still provide that path to success but the nerd culture has already informed students that computer science delivers in spades! It is fresh, exciting, important, modern and has yet to experience its Chernobyl.

Like earlier times in the natural sciences, the nerd culture presents an encouraging and friendly face. Internet newsgroups and the like provide a supportive and competitive forum for neophytes and experts alike. Recall nineteenth century science, when letters to Nature might recount the strange behaviour of a gentleman's dog, or describe flora and fauna observed on a trip abroad.

Start up costs are minimal. One achieves 0 to 60% effectiveness in real world application remarkably fast. Many budding computer science students make money with these skills before reaching university – graduate specialization is unnecessary. Think of the feedback to the student: older generations are amazed and the skills transfer easily to almost any area of application!

Intellectually, general purpose computers are machines which manipulate symbols – some of these just happen to represent floating point numbers. The technology is extremely malleable and so provides a new medium for representing ideas, expressing relationships, and modelling just about anything. The only bounds are the imagination and the finite but very large number of states.

This is power – power with some immediacy. Joseph Weizenbaum expressed it first, and best, as follows:

> The computer programmer, however, is a creator of universes for which he alone is the lawgiver. So, of course, is the designer of any game. But universes of virtually unlimited complexity can be created in the form of computer programs.

> Moreover, and this is a crucial point, systems so formulated and elaborated *act out* their programmed scripts. They compliantly obey their laws and vividly exhibit their obedient behaviour. No playwright, no stage director, no emperor, however powerful, has ever exercised such absolute authority to arrange a stage or a field of battle and to command such unswervingly dutiful actors or troops.
>
> *Computer Power and Human Reason*, 1976, p.115.

Of course, Lord Acton's dictum applies. That this power corrupts was Weizenbaum's point, applied to the often over-reaching claims of Artificial Intelligence.

Challenges

The nerd culture is, I think, a genuine cultural shift. Perhaps not as large as that from a humanities dominated culture to a science dominated culture, but it does seem more a shift than a fashion. How we are to accommodate this shift is a significant challenge to the university and to the natural sciences.

The last shift, that heralded by C.P. Snow's Rede lecture, was accommodated at a substantial cost to the humanities – a cost from which we have yet to recover. Standing proudly aloof, as Bloom said of the humanities, seems a strategy intent on reducing one's influence. And aping the methods of the foreign culture is quickly seen for what it is.

Fortunately, there is much in the sciences that is already heavily computational which could easily be, and should be, made more visible to the student. Gratuitous computational use, however, is not on – aping is aping. In this it is important to remember that, while we may regard the computer as a powerful and even essential tool, in the 'nerd culture' it is the *raison d'être*, a malleable medium for expression – in, of, and for itself.

The challenges to the natural sciences are: to ensure that science and scientific reasoning are an important part of everyone's education, to attract the good students to the sciences, and to apply scientific knowledge and reasoning to this new specialization.

The broader challenge to the university culture is to incorporate important cultural shifts without sacrificing the best of what went before. We have a new shift that requires addressing and we have yet to deal justly with the last much larger shift.

The same questions still need to be answered. Northrop Frye argued in 1963 that C.P. Snow's problem of two (or now more) cultures is not a major problem of society.

> "It is not the humanist's ignorance of science or the scientist's ignorance of the humanities which is important, but their common ignorance of the society they are living in, and their responsibilities as citizens. It is not the humanist's inability to read a textbook in physics or the physicist's ability to read a textbook in literary criticism, but the inability of both of them to read the morning paper with a kind of insight demanded of educated citizens."
>
> From *The Changing Pace in Canadian Education*, the Kenneth E. Norris Memorial Lectured delivered at Sir George Williams University, January 24, 1963 as reprinted in Frye, 1988, p. 69.

What should constitute an education? Must specializations be so specialized? And so soon? Allan Bloom suggests that posing some of these questions would be a threat to the peace, yet pose them we must. But where?

This series of conferences is important in that they provide a rare forum where scholars from across the spectrum of intellectual inquiry can raise and discuss these and like questions. How to foster the same kind of discussion back at our home institutions is a challenge for all of us.

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Shifting cultures:
The role of societal support

M.E. Thompson

The role of societal support

I want to illustrate three aspects of the influence of societal support on shifting cultures. First, the balance of strategic imperatives – the imperatives of the warriors and the victims, to use the terminology of Freeman Dyson[4] – and their impact on the academic imperative to understand:

Table 1: Strategic Imperatives

- defence	
- creation of wealth	warriors
- global competition	
- environmental preservation	
- health and welfare	victims
- social justice	
- quality of life	

Then, two manifestations of a new relationship between societal support and the academic enterprise: the noticeable evolution of traditional modes of support, and a more subtle manifestation contributing to cultural shifts, which I call the "intelligibility test".

What follows is a collage of quotations, with commentary, taken mainly but not entirely from the literature of Canadian funding programs. If there are themes they are the usual ones: that the priorities of the warriors are in ascendance, with strong implications for academic cultures; and that the new stronger engagement of society with the academic enterprise carries with it a sense of ownership which can be wonderfully beneficial but also constricting – but the reader may deconstruct at will!

[4]Weapons and Hope (1984), Chapter 1. Harper & Row, New York.

Balance of strategic imperatives

The new generation of warriors in the developed countries sees a strong analogy between making war and making money. The latter has gained in fascination, being more rewarding and personally fulfilling:

> Nowadays, CNBC has bureaus in London, Tokyo, and Hong Kong. 'We caught on to a Gulf War that's going to last forever. An event like this [stock market tumble] happens and Ron Insana becomes Norman Schwarzkopf', declared CNBC's president, Bill Bolster, ...
>
> New Yorker, Talk of the Town, October 1997

> No doubt the boys in red suspenders have destabilized a government or two in the process. But by their intolerance for officially sanctioned lies, they have helped, not hindered, the cause of democracy. Currency speculators? Call them freedom fighters.
>
> Andrew Coyne, Southam News, November 1997

As a cursory glance at any business section confirms, fascination with money goes along with fascination with the electronic media. The Canada Foundation for Innovation is an extremely important new federal program which funds physical infrastructure for research – equipment and installations and libraries:

> The Canada Foundation for Innovation has earmarked up to $20M for a project to license the electronic delivery of scholarly periodicals to research university libraries across the country ... Some research libraries are still hopeful that a virtual research library, including books as well as learned journals will exist in Canada in the not-too-distant future.
>
> University Affairs, March 1999

Public interest in health research: the plan for a Canadian Institutes for Health Research has recently been launched with the federal budget, which also on an interim basis allocated an increase of $50 million per year for health research over the next three years to the granting councils and established programs:

> An August 1998 poll conducted by Ekos Research found that the vast majority of Canadians attach great importance to health research. In fact, when asked about a variety of policy options, Canadians placed health research only slightly behind funding for medicare, and ahead of tax cuts and debt reduction, as their top choice for government action.
>
> First communiqué, Canadian Institutes of Health Research, November 1998

The people responding to the August 1998 survey no doubt were thinking, "Maybe they'll find a cure for such and such a condition before it's too late for my mother, my brother, my child." In a more recent mission statement, the improvement of the health of Canadians is secondary to considerations of international competition and the synergy of health research and the economy:

> ...it is critical that Canada ensure global competitiveness for the funding of this innovative new enterprise ...
>
> Therefore, as a primary mission, the CIHR will facilitate investigator- initiated and discovery driven research that creates the new knowledge required to feed the innovation pipeline and improve the health of Canadians.
>
> The CIHR Concept
> http://www.cihr.org

A plaintive note, sounded by a plant geneticist who studies the speciation of desert flora:

> At the announcement of provincial funding for UW research on Monday, UW president James Downey remarked that "After a period of relative drought, it can be said that the desert of academic research is beginning to bloom again."
>
> Biology professor John Semple finds some irony in that analogy since, he says, "As a consequence of over concern for 'industrial partners' research by federal and provincial governments, there is an ever decreasing amount of funding for the study of deserts and things that bloom."
>
> UW Daily Bulletin, March 17, 1999

And indeed, the "strategic areas" of the granting councils, of which two are the Natural Sciences and Engineering Research Council (NSERC) and the Social Sciences and Humanities Research Council (SSHRC) are extremely wide ranging but quite anthropocentric:

Table 2: Strategic themes

NSERC	- Biotechnologies
	- Energy Efficiency Technologies
	- Environmental Technologies
	- Information Technologies
	- Manufacturing and Processing Technologies
	- Materials Technologies
SSHRC	- Challenges and Opportunities of a Knowledge-based Economy
	- Society, Culture and the Health of Canadians
	- Exploring Social Cohesion in a Globalizing Era
	- Valuing Literacy in Canada

Modes of support

Another president and another professor, this time talking about donations – the engagement and the snares:

> The thing with private support is that it's not just valuable for the funds it generates, but also for the process of accountability it engenders. Engaging with the individuals and communities that surround us causes us to become a better university.
>
> Rob Prichard, President, University of Toronto, Autumn 1997

> This is the modern tension. The mediaeval scholar had to worry about the church .... We have to concern ourselves with the directing power of money. It's a seductive and driving influence.
>
> Bill Graham, President of University of Toronto Faculty Association, June 1998.

My own department has recently received a very large gift ¿from a donor who insists on remaining anonymous and receiving no benefit from the donation. And there are many others who give large donations to support institutional priorities out of altruism or gratitude. But not every large donor is content to be honored with a scholarship, a lecture series, or a chair. Donor agreements increasingly use the language of partnership.

The older language of collaborative research and development and university/ industry synergy is giving way as well, at least for now, to the language of partnerships: public sector/private sector partnerships where both sides are equally engaged, leading to quantum jumps, simultaneously, in academic prowess and profitability. The Ontario Research and Development Challenge Fund (ORDCF), the agency concerned in President Downey's announcement, talks not of projects but investments:

> ... [we must get used to thinking of] the scholarly pursuit of truth alongside the pragmatic pursuit of profit.
>
> ORDCF spokesman, April 1999

> If your vision does not exceed the complement of researchers and their excellent track records already in place, and if the investment by the ORDCF and your partners doesn't vault your institution into a pre-eminent position in their area, then you probably haven't got an opportunity whose vision encompasses the potential for high levels of excellence and impact.
>
> Open letter to ORDCF community, 1998

SSHRC has taken up the language of partnerships as well, with an emphasis on non-financial returns, and joint ownership of the research activities:

> Dr. Renaud [President of SSHRC] said that the new theme programs will ... forge stronger linkages between university researchers, various communities and institutions – governments, for example – that need social sciences and humanities research expertise in order to craft policy and make decisions ... A key goal is to build interdisciplinary partnerships, bringing together the 'producers' and 'consumers' of research ...
>
> SSHRC Website December 1998

The new SSHRC Community-University Research Alliance (CURA) program will actually receive applications jointly from universities and community organizations. The latter will have not only a stake in the research, but a new kind of ownership.

The intelligibility test

Perhaps the mathematicians feel the intelligibility test as acutely as any. A recent cartoon in the December 1998 issue of The Emissary, showing a mathematician being pelted by rotten tomatoes, has the caption "Let M be an ensemble of matrices with a measure μ ...".

Researchers are increasingly encouraged to explain their work in plain language, to make their work intelligible to the public and to the overseers of the funding programs. In one way this is a very positive development, in that it reflects a public and political eagerness to become involved. But it can also be stifling. Very often, if research has reached the stage where it is ready to be made clear to a non-expert, it is essentially finished research. The intelligibility test cannot easily capture, except in retrospect, the creative throes at the beginning of research. I worry about this particularly in connection with new researchers. The application form for the Ontario Premier's Research Excellence Award, for new researchers, says only that a 150 word summary in plain language must be given. But the instructions for the first round of proposals given to our applicants internally went further:

> [The proposal] is not written for a committee of your peers as are proposals to NSERC/SSHRC/MRC. It will be reviewed first by civil servants in the Ministry ... then by the PREA Board ... generally the committee is composed of experts in bio-technology, engineering and information technology. Both of these groups of individuals should be regarded as intelligent generalists ... Therefore, the proposal *must* be written in general language that these individuals can understand.
>
> UW internal memo, 1998

And the oral instructions went further still: don't use technical terms or acronyms; try to tell a story which will capture the imagination. In later rounds, the intelligibility requirement has given way to an executive summary requirement, with applicants being asked to cut their detailed research proposals down from five pages to two!

The CFI has a standard application form, to be filled out by all, including new researchers applying for equipment under the new opportunities program. For each of ten categories, the applicant must choose a phrase from a menu of phrases, and take up to a page to justify the chosen phrase. The intention is to enable the application to be judged by non-experts:

> The assessment section gives the applicant the opportunity to assess the project against each of the CFI criteria in a structured way, using the ProGrid^{TM} methodology, which is a combined application/evaluation tool.
>
> ProGrid is a procedure for measuring the value of intangible assets, where precise numerical information is not available. It is a decision-assist tool customized to the needs of the CFI ... Reviewers will evaluate the merit of the project using the same methodology.

Seasoned applicants appear to take this new kind of form in stride, though privately regarding it perhaps as an invitation to new levels of perjury. But perhaps a new researcher, at the outset of a program which could go anywhere, should be excused from this kind of exercise.

Apparently even NSERC has been assaulted by the rotten tomatoes of the clamour for plain language once too often, as evidenced by this quote ¿from the French edition of the most recent issue of Contact:

> Just call us "En'serk" – spelled "NSERC" –
>
> Even other federal departments have been known to get the English version of our name wrong ...
>
> Ce texte n'a pas été traduit, car son contenu ne peut être compris que dans la langue de Shakespeare.
>
> CRSNG Contact Printemps 1999

Further up in the text, francophone readers, members of the scientifically educated public, are told that they, like their anglophone counterparts, need no longer remember what CRSNG stands for.

But of course there is a more positive way of looking at that other academic imperative, the imperative to communicate, and I will let a writer on mathematics have the last word (Allyn Jackson of the AMS and MSRI):

> ... What do mathematicians hope to accomplish by influencing media coverage of their subject? If the hope is that increased media coverage will translate into increased financial support for mathematics, that hope might be misplaced. Consider the example of NASA, whose highly successful public relations organization captivated the nation with full-color footage of space exploration but whose budget has shrunk dramatically in recent years. Is celebrity the goal? It is hard to imagine that many mathematicians yearn for the harsh and fickle limelight accorded to celebrities today. Perhaps the aim is simpler: To edify the public about an important part of human culture. This is the most exalted and difficult goal of all. What it requires is a new orientation for media coverage of mathematics, one that makes a place for all the important developments in mathematics, not just the most easily explainable. It also requires mathematicians to think deeply about how to describe in plain terms why these developments are important. The media, with their newfound attention to mathematics, may well be ready to listen.
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> The Emissary, December 1998