

CENTRE FOR
SOCIAL SCIENCE RESEARCH

Aids and Society Research Unit

ENCOURAGING DEADLY CHOICES:
AIDS PSEUDO-SCIENCE IN THE MEDIA

Nathan Geffen

CSSR Working Paper No. 182

February 2007

Nathan Geffen is the policy research and communications co-ordinator of the Treatment Action Campaign (TAC). He has been employed by the TAC since 2002.

Acknowledgements:

The research for this paper was made possible through a Media Fellowship sponsored by the Open Society Foundation for South Africa.

Thank you to Nicoli Natrass, Jeanne Bergman and Elizabeth Mills for reviewing the drafts. Thank you to Thad Metz and Edwin Cameron for helpful ideas. I take sole responsibility for the opinions expressed in this essay.

Encouraging Deadly Choices: AIDS Pseudo-Science In The Media

Abstract

This article discusses the impact and ethics of media coverage on two forms of pseudo-science, namely HIV medical pseudo-science and environmental pseudo-science. The first section introduces some questions that should be raised when assessing the impact of reporting pseudo-science in the media. Coverage on environmental pseudo-science is discussed and contrasted with examples of a more deadly form of denial, HIV pseudo-science, in the second section of the article. The various arguments in support of freedom of information are evaluated in relation to the ethics of reporting HIV pseudo-scientific claims in the media, particularly given South Africa's burgeoning HIV epidemic. The final section of this article presents a number of practical recommendations for editors, journalists and scientists in order to provide an ethical framework for evaluating and covering potentially harmful pseudo-scientific claims in the media.

Introduction

What ethical obligations do editors have when reporting claims that are contrary to well established scientific knowledge? What are the ethical consequences for freedom of speech when pseudo-scientists use the media to promote unproven remedies as alternatives to scientific medicines? How should scientists respond? What can editors and broadcast programme managers¹ who want to ensure the scientific accuracy of their products do to avoid inadvertently promoting nonsense? Medical pseudo-scientific claims are especially concerning because of their potential to influence people to take decisions that risk their health. What are the ethical consequences for freedom of speech when people sick with HIV endanger their lives by trying untested remedies promoted in the media, or people who are HIV-negative practise unsafe sex because they have read that HIV does not cause AIDS and is not sexually transmitted?

1 In this essay, the term editor often refers to both newspaper editors and the content managers for radio and television programmes.

This essay will explore questions dealing primarily with pseudo-scientific claims about HIV/AIDS.² Most pseudo-scientific views on AIDS are collectively referred to as AIDS denialism, i.e. that HIV is not the cause of AIDS, that the risks of antiretroviral medicines outweigh their benefits or that there is not a serious recently developed AIDS epidemic in Africa. These views have received significant coverage, especially in South Africa. I also consider, in less detail, how the media has dealt with pseudo-scientific claims about global warming and evolution. There is scientific consensus that global warming is occurring and that it has anthropogenic causes (Intergovernmental Panel on Climate Change, 2007). There is also scientific consensus that species on earth have evolved via natural selection (American Association for the Advancement of Science, 2002). Nevertheless, some mainstream media publications present these topics as scientifically controversial.

There are interesting similarities in the way pseudo-scientists attack global warming, evolution and HIV in the media. All three sciences are topical in the media. There is scientific consensus on their fundamental tenets. Most interestingly from the perspective of this essay is that the same arguments are made for giving significant space to pseudo-scientific views on these topics. I have considered evolution and global warming because pseudo-scientific reports are not peculiar to AIDS; we can better understand this phenomenon by examining multiple disciplines. Reports promoting the pseudo-scientific scepticism of global warming and evolution raise similar issues to AIDS denialism: What is the role of the mainstream media in reporting science? Is the mainstream media an appropriate forum to advocate the overturning of scientific consensus? Are there different ethical obligations when it comes to giving space to pseudo-scientific medical advice, with its potential to endanger lives, as opposed to intelligent design?

The advocacy of pseudo-scientific arguments against the evidence that global warming is taking place and is anthropogenically caused receives considerable mainstream media support across Europe, the United States and in South Africa. *The Economist*, despite its reputation for high-quality journalism, took a prominent role supporting global warming scepticism. It published several articles in 2001 and 2002 defending the arguments of Bjorn Lomborg, whose book, *The Skeptical Environmentalist*, sought to promote pseudo-scientific scepticism on and minimise the impact of global warming and other

2 I consider AIDS in detail because it is my area of experience.

environmental concerns (Economist, 2001; 2002a; 2002b; 2003; Lomborg, 2001a; 2001b). Numerous other magazines and newspapers have published pseudo-scientific advocacy pieces arguing that global warming is not taking place or that it is not anthropogenically caused.³

In the United States strong social forces, such as the Discovery Institute, promote Intelligent Design (ID) as an alternative to natural selection. Television and radio programmes presenting debates between ID and evolution proponents often take place, but the mainstream media has mostly criticised ID. Nevertheless, ID does occasionally receive some mainstream media support. For example in 1996, NBC showed a documentary narrated by Charlton Heston called *The Mysterious Origins of Man* (Foley, 1996). This programme was recently shown on South African television in December 2005 (SABC, 2005). I deal only with articles published or broadcast in the mainstream media.⁴ This is primarily because when a view is expressed in a newspaper, or broadcast on radio or television, it often carries authority that is not present when something is privately published, for example as a pamphlet or on an Internet site.

The HIV Epidemic And AIDS Denialism

The HIV epidemic is the most pressing contemporary global health problem. UNAIDS estimates that approximately 40 million people live with HIV and that 2.6 million people died of AIDS in 2006 alone (UNAIDS, 2006). In South Africa, over 5 million people are infected and cumulatively about 2 million people have died since the epidemic began (Dorrington *et al.*, 2006).

3 There has also been much pseudo-science in the media purveyed by environmental groups with the opposite agenda of global warming sceptics, i.e. those who grossly exaggerate environmental problems or misrepresent scientific solutions to them. Nevertheless, for the purposes of space and because global warming scepticism a particularly dangerous form of pseudo-science, I do not deal here with these.

4 I include as mainstream media almost all national or city-wide daily, weekly and monthly newspapers and magazines, broadcasts on regulatory approved radio stations and television channels. Even some Internet sites, for example those belonging to mainstream media publications, would fit in this category, but not the vast majority of webpages or pamphlets. There are publications for which it is not clear whether they are mainstream media but clarifying the grey area of the definition of this category is not important for the arguments in this essay.

Antiretroviral treatment restores the health of most people with advanced HIV disease and prolongs life-expectancy substantially (NIH, 2003). However, most HIV-infected people who require treatment do not have access to it. In South Africa, over 500,000 people in need of treatment do not receive it (*Dorrington et al.*, 2006).

Against this background South Africa's President Mbeki and Health Minister Tshabalala-Msimang have been sympathetic to AIDS denialism. This has directly affected the development and implementation of AIDS policy in South Africa, with perhaps hundreds of thousands of lives being lost as a consequence. The struggle between HIV science and AIDS denialism has been the foremost political issue in the response to the epidemic in South Africa (see Nattrass, 2006; Geffen, 2006a; Heywood, 2004).

The scientific evidence is overwhelming that HIV infection causes AIDS, that there is a large global HIV epidemic, particularly in Sub-Saharan Africa, and that antiretrovirals substantially extend the quality and length of lives of the vast majority of people with AIDS. Nevertheless, HIV infection is particularly prone to pseudo-scientific interpretation. The science of HIV is complex and most people do not have the time or will to understand it. This coupled with the virus's invisibility to the naked eye and the sexual stigma associated with it, encourage a desire to deny that it exists.

The progression from HIV to AIDS is long: on average eight to twelve years. It is also highly variable between individuals. On the one extreme, a very small number of people progress to AIDS within months of infection and on the other a very small number of people have remained symptom free without treatment for two decades. The cause of this variability is not well understood and appears to be related to the strain of virus, one's genetically acquired immune system and, to some extent, lifestyle. Furthermore, many people with HIV will experience bouts of health intermingled with bouts of illness (World Health Organisation, 2003).

It is easy to see how people can assign the cause of a long period of symptom free infection or recovery from an opportunistic infection to some or other behaviour, whether it be eating garlic, taking vitamin tablets, some peculiar

aspect of their lifestyle or a myriad other possibilities⁵. There are therefore many unsubstantiated claims circulating about the management of AIDS, some of them promoted by misguided people with good intentions and others promoted by charlatans who wish to make money. In a society such as South Africa where, owing to an abysmal education system inherited from the Apartheid system, people have a poor understanding of scientific method, these claims have resonance and quacks selling unproven remedies for AIDS are prolific.

The South African media has consistently highlighted HIV issues during the last decade. Most editors have advocated changes to inadequate government health policies and held pharmaceutical companies accountable for overpricing life-saving medicines. The role of the media in changing government policy for the better has been invaluable. For the most part, editors have condemned AIDS denialism but, as I discuss here, there have been significant and costly exceptions. This essay should not be seen as a media-bashing exercise, but as an attempt to propose useful measures for editors and journalists who wish to avoid promoting pseudo-science.

Despite the moral stance on HIV taken by most media publications, much HIV reporting in the mainstream media, both written and broadcast, is scientifically inaccurate. The types of scientific errors made by journalists and media houses can be divided roughly into three categories: (1) misreporting important scientific findings or facts, (2) omitting to report important findings and (3) promoting pseudo-scientific responses to the epidemic (Geffen, 2006b).

I deal here primarily with the last of these. However the three error types share a common feature: they arise due to poor scientific training and knowledge, as well as misconceptions by editors and journalists about how science works. Consequently, not only is the science of AIDS misreported, but so too are other scientific issues of immense public interest such as evolution and global warming. However, the effect of pseudo-scientific reporting of AIDS is particularly problematic because it directly encourages people to make poor choices affecting their health, with life-threatening consequences. It is also my area of experience and so I write mainly about it.⁶

5 It should be noted that healthy living, for example exercising regularly and taking vitamin supplements, at least in some populations, have been shown to slow progression to AIDS.

6 I do not debunk pseudo-scientific arguments in this essay. AIDS-denialism, global warming-scepticism and Intelligent Design have been adequately debunked elsewhere.

This is an under-researched area. Some of what is put forward here is speculative. There is a need for quantitative research to provide information such as the prevalence of pseudo-scientific articles on AIDS, their influence, the number of people who have been harmed by such reports, the effectiveness of measures introduced to improve scientific reporting and much else. My objective here is to raise a critical problem so that it gets further public and academic attention, and to propose remedies for these problems. In the absence of sufficient quantitative research, my analysis here must be considered tentative.

Some Examples Of AIDS Denialism In The Media

There have been many examples of AIDS denialism in the media, albeit they are a small proportion compared with articles explaining genuine HIV/AIDS science. I present here some of the most publicised examples of AIDS denialism in the media, either in South Africa, the United Kingdom or the United States, in recent years.

Tine Van Der Maas And Her Unproven AIDS Remedies

Tine van der Maas, a Dutch nurse living in South Africa, and her mother Nellie believe their garlic concoction, ideally mixed with a concoction called Africa's Solution, is a treatment for AIDS. They have produced a video called *Power to the People* to promote their remarkable views. It shows apparently nearly dead patients recovering within days of taking the van der Maas remedy. Not only do Tine and Nellie claim that they can treat AIDS, but also diabetes and various other ailments. They are also sceptical of orthodox medicines and discourage people from taking them.

The South African Minister of Health, Manto Tshabalala-Msimang, appears in the video, not as an incidental extra caught on video by the camera, but approvingly conversing with the van der Maas's about their concoction in a meeting. It has also been played on television in South Africa by the state broadcaster. Nozipho Bhengu, the daughter of Ruth Bhengu, a Member of Parliament of the ruling ANC party, took the van der Maas concoction to treat

herself instead of proven medical treatments. Tragically, she died of AIDS in 2006 (TAC, 2006).

To an unsceptical eye, *Power to the People* is compelling viewing. Patients make apparently miraculous recoveries and the van der Maas's nutritional intervention seems to be the critical factor. It appears beyond co-incidence. But upon scrutiny, the van der Maas claims are almost certainly nonsense. No evidence is presented that the patients were properly diagnosed. Even if they had HIV it is unclear whether they were suffering from the common cold, Tuberculosis, malnutrition or a myriad other possible afflictions when the van der Maas's intervened. AIDS is a disease in which patients typically oscillate between good and poor health, often for years. Furthermore, hospices typically report a short period of improvement when they begin providing care to terminally ill AIDS patients.⁷ It is possible that the van der Maas's witnessed the same effect in some of their patients, i.e. a temporary recovery because of the better care and nutrition they received, followed by decline.

Power to the People presents no independently verified statistics. All the evidence is anecdotal. We see no failures in the video and no patients are followed up for more than a few months. In sceptical parlance she counted her hits but ignored her misses. How many patients did well? How many died or were lost to follow up? The van der Maas's performed unqualified diagnoses and did not follow up patients consistently. Consequently there is no evidence of proper record keeping. In an email discussion, van der Maas told me that 'when you do not hear from patients, they usually are doing well' (email communication between Geffen and van der Maas, 2005). She informed one journalist that her patient records were lost because burglars urinated on them (Brits, 2005).

Anecdotes about the benefits of a medical intervention can be beneficial for public information campaigns if scientific evidence shows that the intervention is effective, but they are dangerous in the absence of such evidence. There is no evidence in the scientific literature that raw garlic administered in large doses is of any special benefit to people with HIV. There is however evidence that the active ingredient in *Africa's Solution*, hypoxis, an extract from African potato, is potentially harmful to people with HIV (NICUS, 2006).

7 Personal communication with Nazareth House, a hospice in Cape Town.

The state television broadcast of *Power to the People* was not a once off anomaly. Tine van der Maas was also given the opportunity to explain her remedies in September 2005 on one of South Africa's most popular radio talk shows hosted by Tim Modise, as well as other forums. Van der Maas's is a troubling example of how medical pseudo-science in the media encourages people to make life-threatening health decisions.

Chriselda Kananda On Kaya FM

Chriselda Kananda is an AIDS denialist who hosted a radio show called *Positive Talk* on Kaya FM, a popular radio station broadcast in Gauteng Province, South Africa. Kananda frequently promoted pseudo-science on the show. On 4 April 2005, the topic of her show was titled *What if everything you ever thought you knew about HIV and AIDS was wrong*. A complaint was lodged against the show by Mindset Health Team (Mindset), a health education NGO with the Broadcasting Complaints Commission of South Africa (BCCSA). The complaint describes the following pseudo-scientific comments made on the Kananda show:

*'HIV has never been isolated or identified
HIV is NOT sexually transmitted
There is no successful medical treatment for HIV or any other virus
ARVs are toxic and will destroy your liver
All HIV tests are not accurate
All people living with HIV should have garlic, ginger and lemon juice every day and this will keep them healthy
The reason people have been dying is because of bad nutrition and lifestyle and not HIV and AIDS.'* (BCCSA, 2005a)

The complaint was upheld by the BCCSA. Kaya FM was ordered to allow Mindset to 'debate the matter on air'. In his ruling, the adjudicator, Professor Henning Viljoen wrote:

'Any broadcaster should know that when tackling a controversial issue like HIV and AIDS, there are opposing arguments in the debate, and it should make every effort to make sure that the listeners get a balanced picture of the issue. ... The broadcaster, by its own admission, allowed a programme on a controversial issue of public importance to be broadcast

in a one-sided manner. This is clearly a contravention of [the BCCSA code].’

Interestingly, a very different judgment was later made by the same adjudicator in a similar matter. Pierre de Vos, a lawyer at the University of the Western Cape lodged a complaint against the Tim Modise show, mentioned above, that hosted Tine van der Maas. The complaint was dismissed. This time, Viljoen wrote:

‘Ms Van der Mass’ [sic] views were probably in the eyes of the Complainant ‘unjustified opinion’ and many people in South Africa would probably agree with him. However, the nature of freedom of expression is that we should not, and cannot, stop people from disseminating their ideas, how unacceptable it may be. Let it be tested in the market place of ideas and let the listeners decide for themselves. There are limits to the freedom of expression where the expression amounts to propaganda for war, advocacy of hatred based on race, religion, etcetera, but the limits to this freedom have not been transgressed in this instance.’ (BCCSA, 2005b)

The adjudicator, although he did not explicitly say so, appears to have felt that by allowing callers to phone in and dispute van der Maas's viewpoint, an appropriate balance was struck. At least, this is the only explanation I am able to offer for what would otherwise be contradictory judgments. It could be argued in response that van der Maas was the guest on the show and was not challenged by Modise. As a trusted talk show host's guest, some listeners would have seen van der Maas as an authority on the subject, more so than those who phoned in to challenge her. But whether this perception is sufficient to render the programme unbalanced within the terms of the BCCSA code is unclear. De Vos appealed but this was dismissed too. The Appeal Tribunal wrote

‘After considering the appellant’s grounds of appeal ... Appeal Tribunal held that the conclusion reached by the first Tribunal was not ‘clearly wrong’ in terms of the Broadcasting Code. In fact, the Tribunal went further and stated that it believes that the conclusion reached was correct and in accordance with the Broadcasting Code. Problematic issues may not be ignored by a broadcaster simply because a few listeners might not understand the contents of a programme within a particular context. Even those who might not have understood the programme within its broader context would know that AIDS cannot be treated without proper advice and that one should not simply go along with the view of one person in a

radio broadcast. The Tribunal holds that it is highly unlikely that listeners will simply jump to new conclusions upon hearing the view of one person regarding the use of lemons and garlic as a 'cure' for AIDS. The programme must be judged as a whole and with due consideration being given to subsequent related programmes. The Appeal Tribunal cannot fault the conclusions reached by the first Tribunal.' (BCCSA, 2006)

Difficult issues arise from these rulings. The BCCSA believes there are limits to freedom of speech including 'expression [that] amounts to propaganda for war, advocacy of hatred based on race, religion etcetera' but it further states with regard to the Tim Modise show that 'limits to this freedom have not been transgressed in this instance.' The implication of this is that the BCCSA is prepared to censure some forms of expression but not those that implore people to harm themselves unwittingly. I shall revisit this issue below.

Also, the BCCSA Appeal Tribunal's statement that it is 'highly unlikely that listeners will simply jump to new conclusions upon hearing the view of one person regarding the use of lemons and garlic as a 'cure' for AIDS' is problematic. Some people do believe van der Maas and have chosen to use her treatments instead of antiretrovirals. It is unclear whether some chose to do so directly as a consequence of van der Maas's radio interviews, but it is possible that they did or that her radio interviews at least contributed to their decisions.

Rian Malan's Articles In Rolling Stone, Noseweek And The Spectator

In December 2003 Rian Malan published two articles, one in the British magazine, *The Spectator* titled *Africa Isn't Dying of AIDS* (Malan, 2003a) and another in a South African magazine, *Noseweek* titled *Apocalypse When* (Malan, 2003b). The articles repeated the thesis of an article published by Malan in *Rolling Stone* in 2001 (Malan, 2001) claiming that there is not a substantial AIDS epidemic in Africa, with particular emphasis on South Africa. Malan claimed that the AIDS epidemic was vastly exaggerated by UNAIDS and other researchers. It implied that there was a conspiracy to inflate the size of the HIV epidemic.

Malan's articles contained several severe technical errors that readers without epidemiological expertise could not have been expected to identify (Geffen,

2004). While *Noseweek* gave space to a response by me which described these errors, they gave Malan further space to reply and make more misrepresentations (see postscript in Geffen, 2004). The debate between Malan and I received considerable media coverage in South Africa. *The Spectator*, however, did not carry any immediate response despite being requested to do so (personal communication with Rachel Holmes, 2006). Many months later, *The Spectator* ran a response (see Barnett et al., 2004) though the magazine ignored the criticism of Malan's article that had taken place earlier in South Africa.

Malan is the author of *My Traitor's Heart* (1991), a best-selling book in South Africa. He is consequently respected by a significant number of South African readers. *Rolling Stone* is an influential magazine in the music industry. *The Spectator* is an influential British magazine and *Noseweek* is a corruption-busting South African magazine. The articles therefore reached wide audiences even though none of these magazines has any AIDS science expertise. Malan's credibility was also boosted by President Mbeki who mentioned Malan positively in his 2004 State of the Nation speech. Though he did not directly refer to Malan's AIDS denialist views, he was pleased with Malan's optimism about South Africa expressed in a Sunday newspaper. In this speech, Mbeki mentioned AIDS once, in passing; he devoted eight paragraphs to Malan (Mbeki, 2004).

David Rasnick And Sam Mhlongo's *Opinion Editorial* In *The Citizen*

On 7 April 2006, *The Citizen*, a widely circulated South African daily newspaper, published a full page opinion editorial by AIDS denialists Sam Mhlongo and David Rasnick claiming HIV could not be transmitted heterosexually (Mhlongo and Rasnick, 2006). They misrepresented a seminal study on HIV prevention in sero-discordant couples (Padian et al., 1997) to substantiate their argument writing, 'This study presented evidence showing that there is no risk of transmission of HIV in heterosexual intercourse.'

The newspaper gave authority to the article by citing both Mhlongo and Rasnick's qualifications and positions. However, Rasnick's position was falsely presented as *Visiting Scientist & Scholar, Dept Molecular and Cell Biology, University of California at Berkeley, US*, a position he did not hold at the time.

They wrote that ‘condoms have a role in the prevention of sexually transmitted diseases (e.g. gonorrhoea, syphilis and chlamydia). Individuals involved in multiple sexual relationships run a much higher risk of contracting any of these diseases if condoms are not used. Condoms also have a major role in reducing unwanted pregnancies. Condoms should be promoted for these reasons and not HIV.’

The Citizen subsequently published several rebuttals including one by Padian, the author of the misrepresented study (Johnson, 2006; Padian, 2006; Venter, 2006). Mhlongo and Rasnick were then given further space to respond. Richard Harland, Chair of the Department of Molecular and Cell Biology, University of California, Berkeley, wrote a letter to *The Citizen* pointing out that Rasnick had misrepresented his university association. *The Citizen* published Harland's letter, but under the heading ‘Rasnick sets the record straight’. Immediately underneath Harland's letter they published an excuse by Rasnick for misrepresenting his record (Harland, 2006).

The manner of the Citizen's publication of Mhlongo and Rasnick's piece created the impression that a controversy existed in the scientific community when in fact there is no such controversy.

Celia Farber In *Harper's Magazine*

In March 2006, *Harper's Magazine* published an article by AIDS denialist Celia Farber titled *Out of Control, AIDS and the Corruption of Medical Science* (Farber, 2006). The fifteen page article argued that HIV does not cause AIDS, the risks of antiretrovirals outweigh their benefits, AIDS in Africa is an umbrella term for old diseases and that the world's largest research institution, the National Institutes of Health, has conducted unethical trials on AIDS drugs. Farber's article contained over 50 errors, documented in Gallo *et al.* (2006). Numerous scientists wrote letters to Harper's expressing concern at the publication of Farber's piece⁸. One letter was signed by over 30 people ‘involved in the struggle against AIDS’. Harper's only published a short letter by Gallo, the co-discoverer of AIDS, to which they gave Farber a response. They refused requests to withdraw editorial support for the article (personal communication with Harper's magazine).

8 See <http://www.aidstruth.org/harper-farber.php>.

The Farber article and the Gallo *et al.* response generated much media comment, including in the Nation (Kim, 2006), the New York Times (Miller, 2006), Columbia Journalism Review (Beckerman, 2006) and others⁹. Harper's was generally criticised, but Farber continued to get positive publicity. For example, the popular science magazine, *Discover*, reviewed her recently published book and also ran an extensive interview with her (Discover, 2006; Kruglinski, 2006). This was despite Farber having neither scientific credentials nor any standing in the scientific community.

Jamie Doran And The BBC

In November 2004, the BBC ran a documentary by Jamie Doran claiming that children under state care in New York City had been used as guinea pigs in an antiretroviral clinical trial. Doran's documentary included an interview with AIDS denialist David Rasnick, mentioned above. The documentary implied that the children were not provided with the best care and were unnecessarily experimented upon. It also alleged that proper informed consent was not given and exaggerated the side-effects of antiretrovirals. The documentary defamed New York City's Administration for Children's Services (ACS) and Incarnation Children's Centre (ICC) (Doran, 2004).

Jeanne Bergman, who has written in defence of the ACS and ICC explained the background and effect of the documentary:

'The attacks on ICC began with a sensationalist story written by Liam Scheff [an AIDS denialist] and circulated on the Internet. The New York Post picked up the story in March 2004, eliciting a spasm of misinformed grandstanding from a few City Council members. But the claims that children at ICC were 'guinea pigs' who were being 'tortured' in hideous medical experiments by a cabal of plotters including the National Institutes of Health (NIH), the Catholic Archdiocese, GlaxoSmithKline, Columbia University and the city's Administration of Children's Services (ACS) weren't taken too seriously until the BBC2 aired a version of the story in November 2004.' (Bergman, 2005)

9 Ibid.

The actual facts were as follows (as explained in Bergman, 2005):

- Almost all the HIV-positive children under the care of ACS who were placed on the antiretroviral clinical trials discussed by Doran are alive today because they were placed on these trials. The medicines that were the subject of the trial were approved by the FDA for adults but at the time the trials began they were not approved for the treatment of children with AIDS. However, children born with HIV had a life-expectancy of approximately two years at the time, and getting HIV-positive children onto these trials represented their best hope of staying alive.
- Children with life-threatening illnesses who are not in state care can participate in drug trials, giving them the opportunity to access potentially life-saving treatments. In 1988 when ICC was founded, children in state care could not participate in drug trials. Those with HIV/AIDS would almost certainly die without even having the opportunity to try potentially life-saving medicines. ICC successfully campaigned for a change to the law that allowed children under their care to participate in clinical trials. Doran's characterisation that the children were guinea pigs placed on trials without parental permission is misleading. The children in question were the responsibility of the state because for various reasons their parents could not look after them. The state -and consequently the institutions caring for them- therefore had the responsibility of determining what was in the best interests of these children. ACS and ICC determined that the best medical option for the children with HIV under their care was to place them on antiretroviral clinical trials. Otherwise they would have almost certainly died.
- Bergman explains that even the cessation of the trials in 2002 was painted by AIDS denialists as sinister. The trials were terminated in 2002 because the drugs tested were approved and the children participating in the trials could therefore access them without the need to participate in clinical trials.

Perhaps the *New York Post's* role in this example of poorly researched, biased and sensationalised reporting is unsurprising; it is after all a tabloid. But the BBC's airing of Doran's documentary is perplexing and concerning.

Freedom Of Expression And Medical Pseudo-Science

Media articles that promote AIDS denialism are concerning because they put lives at risk. This poses a challenge to the principle of freedom of expression. John Stuart Mill's *On Liberty* remains a fundamental defence of freedom of expression (Mill, 1859). *On Liberty* eloquently states: 'If all mankind minus one were of one opinion, mankind would be no more justified in silencing that one person, than he, if he had the power, would be justified in silencing mankind.' Mill offers two reasons for this position, (1) if the opinion is right, no matter how small the possibility, 'we are deprived opportunity of exchanging error for truth' and (2) if the opinion is wrong, 'the clearer perception and livelier impression of truth is produced by its collision with error.'

It is because of Mill's reasons that no legal sanctions should be introduced against mainstream media outlets that promote pseudo-science, i.e. there is a possibility, albeit remote, that a pseudo-scientific argument might be correct and even if it is not, giving voice to a pseudo-scientific argument might have the effect of better clarifying its antithesis.

This has previously been discussed in the context of AIDS. In 1993, the British *Sunday Times* newspaper ran articles by their science correspondent Neville Hodgkinson claiming that HIV was not the cause of AIDS. The editor of *Nature*, John Maddox, responded with criticism of the *Sunday Times* for consistently misrepresenting the facts. Andrew Neil, the editor of the *Sunday Times*, defended Hodgkinson, made various accusations against *Nature* and affirmed the right of his newspaper to continue the search for truth (Durant, 1994). Durant (1994) in the *British Medical Journal* wrote 'One concerned politician has put it to me in discussion of this case: What should you do when journalists start killing people?' Durant went on to write:

'What, finally, should concerned scientists and doctors do in the face of what they take to be overtly misleading reporting on HIV and AIDS? What they should not do, I suggest, is campaign for censorship. Quite apart from the obvious moral and political difficulties of this option, there are enormous practical difficulties to be faced. Who would decide when scientific consensus is sufficiently secure to justify mandating a particular position in public? It is worth remembering that a generation ago, a very

different Sunday Times contributed substantially to the exposure of the thalidomide tragedy.'

He forcefully continues:

'Far more appropriate than censorship of irresponsible science journalism is vigorous challenge to it on its own ground - namely, in the mass media. John Maddox is a journalist, not a scientist; and his instinct to throw down the gauntlet to the Sunday Times is entirely appropriate. If a prominent national newspaper wishes to champion a point of view that the vast majority of scientists - and, not coincidentally, the vast majority of science journalists - believes to be dangerously wrong, then it must expect to face the wrath of the scientific community and the condemnation of other parts of the mass media. In the end, the problem of bad science journalism is best solved not by censorship but rather by good science journalism.'

Durant is mostly correct. Censorship is not an appropriate way to deal with pseudo-science on AIDS or any subject. But there are problems with Durant's reasoning, such as his comparison between the *Sunday Times* reporting on AIDS and its reporting on thalidomide. There are also cases where legal repercussions are justified. I will discuss this in more detail, but Durant's key points are critical: good science journalism and the wrath of the scientific community needed to counter pseudo-science.

Should Pseudo-Science Be Censored If Lives Are Endangered?

Every legal system punishes or censors some forms of expression such as child pornography or defamation. Advertising (commercial speech) is usually heavily regulated. For example, tobacco smoking is restricted in many countries, including the United States, United Kingdom and South Africa. Taking a position of absolutely unrestricted freedom of expression is not an ethical norm found in any modern society. Given that some forms of expression, including some forms of speech, are not protected, it is worth enquiring if the principles underlying restricting expression have any bearing on the promotion of pseudo-science.

Dolan Cummings has recently written a compelling defence of free speech in *Spiked* (Cummings, 2006). In the somewhat different context of people being incited to hatred, Cummings writes:

‘Some argue ... that there are particular audiences that are incapable of thinking rationally, whose reason is especially flammable. But this is a very different and less persuasive argument. The convincing examples of constraint are the ones in which any reasonable person would head for the exit [in response to the false shout of fire in a crowded cinema], move the plane to a particular altitude [in response to false information from an aeroplane controller to a pilot], or [a blind person] step[ping] wherever they were told [in response to false malevolent instructions]. The spurious ones involve disdainful judgements about the people likely to be hearing particular messages: racist mobs, religious fanatics and so on, or absurdly misanthropic assumptions about human beings in general.’

He further writes:

‘In the ‘fire’ case, people have no opportunity to weigh up or consider what is being said; a fire alarm demands immediate action to avoid the danger. In the case of political speeches or religious sermons, even of the most fiery variety, the audience listens and absorbs what is being said before deciding what if anything to do about it. Even racist thugs at a proverbial neo-Nazi rally are not attack dogs, and however unsavoury the speaker might be, it is the audience and not the speaker who must be held responsible for what they do after the rally, even if we despise the speaker for his part in any hypothetical violence.’ (Cummings, 2006)

Ordering an actual attack dog to maul somebody is a different matter, and clearly nothing to do with free speech. Similarly, ordering a robot to commit murder, or – let’s really go to town here – speaking into a voice-operated gun, are examples in which ‘speech’ very directly causes something to happen. But these are easy examples to dismiss, because they have nothing to do with real speech, free or otherwise. To have any meaning as speech, words have to be directed at other human beings; speech is communication, and implies a listener capable of understanding and consciously responding to what is being communicated.’

Cummings makes out a case for radical free speech, only allowing for restrictions in what he correctly portrays as ‘easy examples to dismiss’. But the

Cummings' standard is not generally accepted. In most, probably all, democracies, the incitement of acts that lead to violence are legally liable. For example radio broadcaster Joseph Serugendo, was found guilty by the International Criminal Tribunal for Rwanda of inciting genocide and sentenced to six years imprisonment (ICTR, 2006). It is implausible to argue in the face of nearly a million deaths, many of them inspired by a radio presenter baying for blood, that the principle of free speech stands above human life.

Arguably, some democracies can afford to tolerate hate speech because of a culture that minimises the risk of its violent outcomes. But others, with histories of oppressive supremacist regimes based on racist ideology, have decided they cannot -including South Africa, Germany and Austria. The position of unconditionally defending hate speech in any society, even while opposing its content, does not sufficiently account for the cases where hate speech has spilt blood on a grotesque scale.

Mill in his defence of freedom of expression admitted this exception, which is referred to as the Harm Principle (Stanford Encyclopedia of Philosophy, 2002):

‘[E]ven opinions lose their immunity when the circumstances in which they are expressed ... [instigate] ... some mischievous act. ... Acts, of whatever kind, which without justifiable cause do harm to others may be, and in some important cases absolutely require to be, controlled by the unfavourable sentiments, and, when needful, by the active interference of mankind. The liberty of the individual must be thus far limited; he may not make himself a nuisance to other people.’ (Mill, 1859)

Someone who promotes pseudo-scientific medical treatments instead of scientific ones ‘does harm to others’ without ‘justifiable cause’ and is ‘a nuisance to other people’. There is no significant ethical difference between inciting violent hatred versus inciting people to follow pseudo-scientific medical advice that can make them sick or result in their death. If we agree that we are not obligated to protect the former, then we are also not obligated to protect the latter. It is true that the victims of a speech promoting violent racial hatred are not usually the ones acting on the speech, while the victims of pseudo-scientific medical promotion usually are except in the case where they act on pseudo-scientific advice to treat their ill children. Nevertheless, the victims of pseudo-scientific medical advice can be vulnerable people with poor educations, minimal if any scientific training and insufficient resources for exploring different points of view about their health-threatening condition. It is

unreasonable to argue that people in this position are solely responsible for their decision to use a pseudo-scientific remedy and that there is no responsibility for the promoter of the remedy.

There is a tension here that is complex to resolve. The classic liberal arguments in favour of free expression and the clash of ideas in the market place assume that all participants are well placed to make good judgements. Liberals, correctly, are worried about a paternalistic approach that overemphasises vulnerability and the incapacity of some people in society to judge the value of poor medical advice. However, it is an inescapable fact that there are such people and that the promotion of pseudo-scientific medical advice is life-threatening. There is a powerful case that the state should not be required to protect such expression.¹⁰

Therefore, within Mill's principles, a plausible case can be made that we are not obligated to protect the expression of AIDS denialists who implore people with AIDS, via the mainstream media, not to take antiretroviral treatment. However, the same case cannot be made against proponents of Intelligent Design and the types of AIDS denialism espoused by Rian Malan. These should be protected by freedom of expression laws, even though they are false because they do not implore people to commit harm directly to themselves or others¹¹. But direct messages to not take antiretroviral treatment or to take some alternative unproven remedy, such as the Chriselda Kananda show, described above, or the van der Maas's *Power to the People* video do not have to be protected: they directly advise vulnerable people to make life-threatening choices.¹² The Tine van der Maas interview on *Tim Modise* and Celia Farber's article in *Harper's Magazine* are less clear. In the Tim Modise case, the implied BCCSA argument that balance was created because callers were given the opportunity to phone in

10 Thank you to Nicoli Natrass for suggesting much of the wording in this paragraph. I take full responsibility for the view expressed which is not necessarily endorsed by Natrass.

11 If pseudo-scientific views such as Malan's become dominant (which thankfully they have not) they do cause harm, but not in the direct sense meant by Mill. Therefore they are not subject to the Harm Principle. .

12 Global warming scepticism is more complex. The dominance of this pseudo-science in some highly respectable publications has delayed the implementation of policies that will affect the lives of people in the future. However, there are two reasons why global warming scepticism should be protected speech: (1) It is unclear whether the Harm Principle can be applied to harm so far in the future, in which the number of victims and who they are remain unknown. (2) The major policy changes required to mitigate global warming can hardly take place, at least in democratic societies, unless there is an environment of protected expression where any view can be freely expressed.

and argue with van der Maas, which some of them did, might be sufficient to escape the Harm Principle argument. In the Farber case, she clearly advocates unsound medical advice that could have life-threatening consequences, but the readers of *Harper's Magazine* are not vulnerable in the same way that listeners to popular South African radio shows are. Harper's readers have much more resources to determine the truth. A reasonable Harper's reader can easily obtain further reading materials and investigate opposing views. Given that these examples are unclear and that censorship should be undertaken with extreme caution, prudence indicates that they should be protected.

But saying that we are not *obligated* to protect a particular kind of expression on ethical grounds is not equivalent to saying we must ban it. To determine whether we should censor such speech we need to consider more than just the underlying ethical principles of freedom of expression, we must also consider the consequences of such censorship. Any form of censorship rightfully troubles a free society. Censorship causes concern that freedom is being eroded. If a clever argument can be presented for censoring one type of opinion today, what clever argument will be proposed to censor another type of opinion in the future? Although this 'slippery slope' type of argument is insufficient by itself to state unconditionally that speech causing harm should be protected, it does warn us to tread carefully.

There are three good reasons to oppose censorship of AIDS denialist articles in the mainstream media that encourage people to make potentially deadly medical choices.

First, such censorship would give credence to the claims of pseudo-scientists that there is a conspiracy to silence them. Indeed censorship would by definition imply a conspiracy to legally stop the expression of their views. This would likely undermine the credibility of scientists, particularly HIV scientists, with the public, a consequence which might be as dangerous to society as the risk of some people with AIDS following the advice of AIDS denialists. It might also result in a general loss of confidence in AIDS science by a significant section of the public. The same AIDS denialist views could still be promoted on the Internet or through pamphlets and books anyway, so there would likely be minimal success in suppressing their views. In any case, with the emergence of new media technologies there is a growing blur between the influence of mainstream media, which can be easily policed, and, alternative Internet-based media, which can hardly be policed at all.

Second, it is my experience that Mill's second reason for freedom of expression, albeit exaggerated by Mill, is not without merit. That AIDS denialists can express their views in the mainstream media without fear of legal repercussions has given the motivation and opportunity to AIDS scientists to explain the science of HIV to a wider, non-specialist and non-scientist audience. For example, the response written by Gallo *et al.* (2006) to Celia Farber's article in *Harper's Magazine* was the most downloaded document off the Treatment Action Campaign's website for some time¹³. Thousands of people downloaded and read it. Comments on blog forums and in popular articles indicated that many who read it were non-scientists with an interest in science. While it would be much better if scientists and popular science writers were organised enough to regularly explain the science of HIV without having the motivation of responding to AIDS denialists, this has often not been the case.

Third, there are threats to freedom throughout the world today, including in democratic countries. Symptomatic of this is the South African government's recent attempt to implement legislation that would have required, in some circumstances, pre-publication approval of newspapers articles. The legislation was eventually dropped as it was unlikely to pass a constitutionality test. In the United States and United Kingdom legislation has been introduced in recent years restricting liberty. In such an atmosphere, proposing new restrictions on expression could have the effect of supporting state attempts to restrict freedom and as such should be resisted.

Therefore, we must be cautious and preferably not censor the promotion of dangerous medical advice. Conversely, we can afford not to censor *Power to the People* and Chriselda Kananda, therefore it is better not to do so. There are, however, cases where action must be taken, for example, when a concerted propaganda campaign takes place aimed at vulnerable people. In 2005, a vitamin entrepreneur Matthias Rath ran a series of advertisements in the South African media claiming that micronutrients alone reverse the course of AIDS and that antiretrovirals are toxic. His advertisements were withdrawn following an order by the Advertising Standards Authority of South Africa (ASASA). Rath however proceeded to distribute thousands of pamphlets making the same claims in South African townships. This no longer fell under the enforceable jurisdiction of ASASA. The Treatment Action Campaign has taken steps to have this pamphlet distribution banned. Rath's pamphleteering clearly falls foul of

13 That is, other than the front page of the website and other navigational as opposed to content pages.

Mill's Harm Principle: it directly endangers the lives of vulnerable and poor people, with minimal access to libraries, accurate medical information and scientific education. In such circumstances, a reasonable person with HIV might very likely believe Rath and take medical decisions that result in unnecessary morbidity or premature death. It is true that some people in these circumstances would find the time and energy to investigate Rath's claims and conclude that they are false. Indeed, many did. But it is unreasonable to expect all, or even most, reasonable people exposed to Rath's pamphlets in these circumstances to do so. There are several documented cases of people in Khayelitsha, a South African township, participating in Rath's multivitamin programme and dying (TAC, 2005; Thom, 2005). Rath can express his opinions, absurd as they are, on his website, try to publish them in a journal or newspaper or explain them in letters to Members of Parliament, as he did. But he should not be allowed to conduct a sustained propaganda campaign with the potential to destroy the lives of many people who are not in a position to determine that his opinions are false. The South African Medicines Act expressly forbids false claims about medicines in advertising and it is under this act that the TAC is litigating against Rath. The ethics of restricting advertising are discussed further in Appendix One.

Misunderstanding What Freedom Of Expression Implies

Here are three examples of common inappropriate responses to criticism levelled by the scientific community against pseudo-science that appear in the mainstream media:

1. *The Economist* has promoted the pseudo-science of Bjorn Lomborg. It defended an attack against Lomborg by the scientific community by writing this:

‘The January issue of Scientific American devoted many pages to a series of articles trashing ‘The Skeptical Environmentalist’. The authors, all supporters of the green movement, were strong on contempt and sneering, but weak on substance. The arresting thing about Scientific American's coverage, however, was not this barrage of ineffective rejoinders but the editor's notion of what was going on: ‘Science defends itself against the Skeptical Environmentalist’, he announced. How can using science to show that the world's forests are not disappearing, and the rest, constitute

an attack on science? ...More is at stake here than a row about a book or the judgment of a magazine editor. Many of Mr Lomborg's critics are respected scientists. Some seem to think that Mr Lomborg's lack of training in their fields disqualifies him from debating environmental policy. ...Environmental policy involves politics and economics, compromises and trade-offs, a division of burdens geographically and over time. It could not be left to scientists, even if they agreed on the science.'

2. Brendan O' Neill expressed a similar view in *Spiked* in an article titled 'The demonisation of "climate change denial" is an affront to open and rational debate':

'Whatever the truth about our warming planet, it is clear there is a tidal wave of intolerance in the debate about climate change which is eroding free speech and melting rational debate. There has been no decree from on high or piece of legislation outlawing climate change denial, and indeed there is no need to criminalise it, as [an] Australian columnist suggests. Because in recent months it has been turned into a taboo, chased out of polite society by a wink and a nod, letters of complaint, newspaper articles continually comparing climate change denial to Holocaust denial. An attitude of 'You can't say that!' now surrounds debates about climate change, which in many ways is more powerful and pernicious than an outright ban. I am not a scientist or an expert on climate change, but I know what I don't like - and this demonisation of certain words and ideas is an affront to freedom of speech and open, rational debate. The loaded term itself - 'climate change denier' - is used to mark out certain people as immoral, untrustworthy.' (O'Neill, 2006)

3. In response to my debunking of Rian's Malan article in *Noseweek*, the editor, Martin Welz, wrote:

'Why is it that so few people are able to conduct a civilized discussion about Aids Face to face ... Check these personal insults aimed at Rian Malan in a press release issued by [Nathan Geffen of TAC]: "Malan's 'research', which contains hardly any verifiable references, is shoddy journalism. It is littered with serious errors, one of them highly misleading (as well as obvious upon reading the source he quotes). Certainly Malan is an entertaining read. But unattributed quotes, unnamed science journals, unnamed experts, misrepresentations, leaving out critical evidence and a

plethora of incorrect facts have no place in a thesis that purports to be debunking the current orthodox scientific view.” Malan's article wasn't a thesis, it was a magazine article written for ordinary mortals, not for Aids devotees. Has the tone of Geffen's response perhaps got something to do with the fact that the subject has somehow got clothed in religious fervour. It struck me early on that the popular refrain “Do you believe that HIV causes Aids” has much in common with the question “Do you believe in Jesus Christ” with all its implications of damnation or salvation. And here we were thinking medicine is based on science, with all its human limitations. Can we please start this discussion again, Mr Geffen...’ (Welz, 2004)

Stripped of their rhetoric the points that *The Economist*, O'Neill and Welz appear to be making are:

1. Science progresses by considering different views.
2. By publishing or supporting the publication of unorthodox views in mainstream media, scientific discussion is advanced.
3. Ridicule or harsh criticism of unorthodox views discourages their publication, undermines science and undermines freedom of speech.

These points are either misleading or wrong. Let us examine each one:

Science progresses by considering different views.

Science does advance through the presentation of different views containing different sets of evidence. But over several centuries standards have been developed for presenting views: scientific articles have to be appropriately referenced, they have to be reviewed by peers and they have to conform to a certain style. These standards have developed for good reasons: the evidence and arguments in scientific articles must be verifiable (hence, for example, the need for references) and free of the rhetoric that characterises most polemical writing because this obscures the evaluation of evidence and argument. The Malan pieces did not conform to these standards and it was therefore appropriate to criticise Malan, harshly, for this. Similar criticisms were made against Lomborg in the *Scientific American* rebuttals (Scientific American, 2002). *The Economist's* characterisation that the authors ‘were strong on contempt and sneering, but weak on substance’ is ironic because it is an appropriate

description of *The Economist's* defence of Lomborg not the *Scientific American* criticisms of him.¹⁴

By publishing or supporting the publication of views that challenge the scientific consensus in the mainstream media, scientific knowledge can be advanced.

When evidence comes to light showing that the scientific consensus is wrong or might be wrong, scientific knowledge certainly is advanced by its publication. Scientific journals should and do publish such evidence if they are appropriately presented with references and consistent intelligible arguments. But science is not advanced by the publication of incompetent research in popular newspapers, magazines, television and radio programmes; this only serves to confuse the public. Pseudo-scientists use the mainstream media to promote their views because they cannot successfully publish them in the scientific literature, where they have been evaluated and found to be nonsense. The consequence is confusion, as well as disproportionate representation for pseudo-scientists, and this is rightfully a cause for annoyance for scientists and cause for concern in a world where much depends on public understanding of science. *The Economist* is not competent to publish articles claiming to overthrow the scientific consensus on global warming and other environmental issues and *Noseweek* is not competent to publish articles claiming to overthrow the scientific consensus on AIDS. Of course, they *have the right* to do so, but that does not *make them right* or worthy of any sort of respectful response from the scientific community or society generally. Indeed, the promotion of nonsense is an invitation to ridicule. Lomborg and *The Economist* are certainly competent to discuss the policy consequences of scientific knowledge about the world's climate, but Lomborg and *The Economist* did not merely discuss policy, they directly misrepresented scientific findings.

Welz, perhaps without intending to, admits this point when he says 'Malan's article wasn't a thesis, it was a magazine article written for ordinary mortals, not for Aids devotees.' Precisely. It wasn't science, it was popular magazine writing masquerading as science and it was incompetent, misleading and irresponsible.

14 It is beyond the scope of this essay to describe the numerous errors in Lomborg's work described in the *Scientific American* rebuttal. Interested readers should read the rebuttal which is available online (see references).

Ridicule or harsh criticism of unorthodox views discourages their publication and undermines science.

This appears to be the main point being made by O'Neill, *The Economist* and Welz, all of whom then use ridicule and harsh criticism in their responses. This is surely disingenuous. Ridicule and harsh criticism are part of the free flow of ideas¹⁵. Calling for them not to be used in response to incompetence shows a disrespect for freedom of speech. (To be fair to O'Neill, he was partly responding to an absurd call for global warming scepticism to be banned, but he used this hysterical demand to take issue with the harsh criticism that is meted out to global warming sceptics by scientists.)

O'Neill's statement that the 'demonisation of certain words and ideas is an affront to freedom of speech and open, rational debate' is untenable -not least because O'Neill frequently 'demonises' ideas with which he disagrees. Many ideas are discouraged, quite correctly, for example Stalinism, Nazism, racism or the promotion of smoking. Although many ideas are discouraged, this should not be seen as being the same as suppression; the ascendancy and descendancy of ideas through open debate naturally results in the encouragement and discouragement of ideas. In any case, pseudo-scientific ideas can be expressed in many ways, including on the Internet, in pamphlets and submitting articles to scientific journals (albeit that they are unlikely to be published frequently in the latter if they are indeed pseudo-scientific). There will always be newspapers and broadcasters who will publish pseudo-scientific ideas, even if the proposals made in this essay are widely adopted. So O'Neill's concern about suppression of ideas is without basis, at least in this context, no matter how discouraged or ridiculed these pseudo-scientific ideas have become.

However, ridicule is frequently not an effective rhetorical tool. Scientists or defenders of science wishing to respond to pseudo-science should therefore be cautious using it. But choosing to use it does not necessarily undermine freedom of speech. Furthermore, it should be noted that my response to Malan did not ridicule unfairly: Malan's articles did contain unattributed quotes, unnamed science journals, unnamed experts and misrepresentations. It left out critical evidence and contained a plethora of incorrect facts. Pointing this out might have the effect of ridiculing Malan, but this was the consequence of publishing such poor journalism.

15 The absurdity of this view cannot be overemphasised. Welz, *The Economist* and O'Neill regularly use ridicule to undermine ideas they disagree with.

The right to free speech merely gives one the right to say what one chooses, within the limits of Mill's Harm principle, without fear of state repression or physical violence. It does not offer protection from ridicule, shame and exposure as a fool. Furthermore, the right to publish does not mean it is right to publish¹⁶. The mainstream media has a right to give pseudo-scientists exposure. No mainstream publication should fear legal reprisal for publishing pseudo-science, but it is irresponsible to do so if such views are presented with apparent editorial support or without pointing out that they are disputed by most scientists.

Recommendations For Editors And Journalists

Presumably most editors want -indeed, they should want- their articles or broadcasts on science to be informative, easy-to-understand, accurate and responsible. Many scientific issues are highly technical and achieving these goals is not easy. Creating specialised science reporting positions, sending journalists on science and statistics courses, implementing stringent fact-checking procedures, consulting with scientific experts at science journals and in academic institutions are all obvious measures that should be implemented if resources are available.

However, many newspapers, radio and television stations do not have these resources. Even those that do are not necessarily in a position to run accurate scientific reports. For example, *Harper's Magazine* has a fact-checking procedure and presumably their editor at the time that Celia Farber's article was published, Lewis Lapham, believed her to be a competent science reporter. *Harper's Magazine* went wrong because Lapham thought that his journal had the expertise to challenge the scientific consensus. It was arrogant of him to think that one journalist, Farber, with no substantive scientific qualifications or affiliations could with one non-technical article overturn the scientific consensus that has been developed globally by tens of thousands of scientists and millions of hours of research, reflected in over 200,000 peer reviewed articles on HIV.

For editors who wish to avoid the kind of error Lapham made, I wish to propose a principle (which I refer to as the *consensus principle*): *Unless there are highly exceptional circumstances, do not run unchallenged articles claiming to overturn the scientific consensus.*

16 Thank you to Jeanne Bergman for pointing this out to me.

By an unchallenged article, I mean one that appears without a second article responding to it, in the same issue or broadcast with an equivalent amount of space or time and that is written by a recognised expert representing the scientific consensus.

Several objections can be made against the consensus principle. I discuss them here.

Objection One: Scientific Consensus Is Poorly Defined

One objection that was offered when I proposed the consensus principle was that it is unclear what is meant by scientific consensus or how to judge what the scientific consensus is. Scientific consensus usually means the opinion on a scientific matter held by the vast majority of scientists who research that matter. This is a suitable definition for this discussion. It is true that there are many scientific matters on which there is no scientific consensus or on which scientific consensus is hard to determine, but for many important issues, scientific consensus is clear. The principle only applies to such cases. It is not controversial that the vast majority of medical scientists believe that HIV causes AIDS, or that the vast majority of climatologists believe that global warming is occurring or that the vast majority of biologists believe that evolution, as a consequence of natural selection, is a fact. It is of course possible that the majority views, i.e. the scientific consensus, are wrong. Nevertheless, these views are the scientific consensus. The success of the principle relies on the assumption that an honest editor can identify such cases.

Objection Two: Scientific Consensus Often Changes

A more critical objection that could be offered against the consensus principle is that the scientific consensus is not necessarily correct and consequently the consensus principle would result in the scientific consensus not being overturned. The conclusion of this objection is however incorrect. It is true that the scientific consensus is often changed. Sometimes scientific consensus is not merely modified, it is completely wrong. A presentation by Naomi Oreskes makes this clear:

‘There have been scientific consensus in the past -even the recent past- that have turned out to be wrong. ...Not merely incomplete, reduced in scope of validity, modified, adjusted, or seen in retrospect to have been only approximately true...but flat-out wrong.’ (Oreskes, 2006)

She describes in detail one such example, continental drift. In the early part of the 20th century the scientific consensus was that the continents were fixed. In the 1960s the consensus changed. There are other important examples.

However, I am unable to find a single example of the mainstream media successfully overturning the scientific consensus. Every case of the scientific consensus changing or being overturned that I have examined has occurred using the tools of the scientific community such as scientific conferences, publication in peer-reviewed journals and the publication of technical papers and books. However, I have not systematically examined this question and it is possible I am wrong. I hope other researchers will therefore examine this more methodically and give a more confident analysis. It is definitely the case that the consensus principle is only workable if I am right, i.e. that scientific consensus has hardly ever, perhaps never, been changed by the mainstream media.

The mainstream media is however a forum for presenting scientific controversies to the public, reporting that a new consensus has been reached or where the policy consequences of scientific findings should be debated.

The Thalidomide case

As discussed earlier, Durant in the BMJ suggested that the *Sunday Times* was emboldened to question AIDS science because it had done so successfully before with thalidomide. There are two problems with this comparison: (1) it was not the case that the safety of thalidomide ever represented scientific consensus in any meaningful sense and, more importantly, (2) the dangers of thalidomide were exposed in letters written to medical journals and in scientific meetings before exposure in the media. This is documented in the *Sunday Times*' history of the thalidomide scandal, ‘Suffer the Children’ (Knightley et al, 1979). The *Sunday Times* and other newspapers played the critical and noble role of exposing the thalidomide scandal to the public and demanding justice for the victims. The mainstream media also ran debates about how drugs were tested and monitored. This is indeed the job of the mainstream media and not beyond

its competence, but it was not the *Sunday Times* or any other mainstream publication that actually discovered the toxicity of thalidomide or performed the seminal analysis of the available data that demonstrated the dangerous effects of thalidomide during pregnancy.

Objection Three: Violation Of The Principle Of Journalistic Balance

Another objection that might be offered is that the consensus principle violates the principle of journalistic balance. This is a misunderstanding of the principle. Abiding by it does not mean that non-consensus positions are not given space, but merely that they are not given more time or space in the same production.

However, the concept of journalistic balance is itself problematic and is worth considering here. The BCCSA ruling in favour of Mindset makes the following point:

‘Any broadcaster should know that when tackling a controversial issue like HIV and AIDS, there are opposing arguments in the debate, and it should make every effort to make sure that the listeners get a balanced picture of the issue’ (BCCSA, 2005a).

The BCCSA appears to believe that a balanced picture means giving all sides of a debate space and this is indeed a position held by many editors and journalists. On closer scrutiny I believe this conception of balance is flawed. The number of pro AIDS denialist articles in the over 200,000 published peer reviewed articles on AIDS in the Public Library of Medicine is likely only slightly above zero. Scientists are all but unanimous in the view that HIV causes AIDS. Presenting both views in media reports, or giving them equal space, can create an illusion that there is a real scientific controversy when there actually is not. Understanding balance as presenting both points of view is not an appropriate reflection on the state of human knowledge.

This debate over balance has arisen with global warming as well. A study by Fairness and Accuracy in Reporting (FAIR) of 636 hard news reports on global warming in four major US newspapers found that 53% ‘gave roughly equal attention to the views that humans contribute to global warming and that climate change is exclusively the result of natural fluctuations.’ They also found that ‘35 percent emphasized the role of humans while presenting both sides of the

debate’, ‘6 percent emphasized doubts about the claim that human-caused global warming exists’ and ‘6 percent only included the predominant scientific view that humans are contributing to Earth's temperature increases.’

Yet, these statistics do not reflect the scientific literature. A survey of over 900 peer-reviewed papers found that none disputed the anthropogenic cause of global warming and 75% either explicitly or implicitly supported the scientific consensus (Oreskes, 2004). The impression of a major scientific controversy has been created by some media where no such controversy actually exists. The FAIR study authors state:

‘Balanced coverage does not, however, always mean accurate coverage. In terms of the global warming story, 'balance' may allow skeptics—many of them funded by carbon-based industry interests—to be frequently consulted and quoted in news reports on climate change.’ (Boykoff and Boykoff, 2004)¹⁷

For many well-confirmed scientific facts, there are fringe beliefs. But we would not expect newspaper reports on astronomy to present the view that some people dispute that the earth orbits the sun. Nor would we expect reports on cancer to present the view that faith-healing is considered an alternative to chemotherapy. Surely the same applies to global warming and AIDS where the scientific consensus is clear.

Objection Four: It Is A Form Of Self-Censorship

Another argument against the consensus principal is that it is a form of self-censorship. This is misguided. It is a principle aimed at improving the quality of reporting. It is no more a form of self-censorship than any other quality control that a media outlet concerned with producing ethical and high-quality reporting would choose to implement. Many mainstream media outlets, especially quality ones, conform to one or more widely accepted guidelines including ethical ones. Many journalists abide by the Society of Professional Journalists Code of Ethics (1996). Many editors take action against journalists who transgress ethical principles (see Keeble, 2001), as in the cases of Jayson Blair and Stephen Glass, who fabricated stories written in the *New York Times* and the *New Republic*

17 I recommend this article which demonstrates the problems with the journalistic concept of balance.

respectively, which are highly publicised examples of this. Media outlets who wish to improve their science reporting can consider the consensus principle presented here as part of a package of measures implemented to improve science reporting. This is not self-censorship in any meaningful form; it is improving quality in order to give readers, listeners and watchers a better service.

Objection Five: Misplaced Responsibility On The Media

The final objection I address is that the *consensus principle* unfairly places the responsibility of the popularity of certain pseudo-scientific views on the media instead of where this responsibility primarily lies – with political, religious or business leaders who support pseudo-science and have more influence over sections of society than the media. It is true that support for pseudo-science by influential political or business leaders is key to the popularisation of these ideas. This has been the case with President Mbeki with respect to AIDS denialism as well as elements in the current US Administration of President Bush with respect to global warming scepticism and Intelligent Design. Nevertheless, this demonstrates the need for the media to fulfil its role of vigilantly exposing such vested interests. Mbeki and elements within the Bush Administration bare much responsibility for the promotion of pseudo-science but it is not solely their responsibility; there has been no shortage of sycophants and self-promoters in the media ready to come to their defence.

Exposing Unethical Scientific Practices

The consensus principle should not be misconstrued to mean that scientists and scientific journals should not be criticised or exposed for unethical practices by mainstream publications; they definitely should. For example, the *Wall Street Journal* and *New York Times* recently criticised the journals *Neuropsychopharmacology* and the highly respected *Journal of the American Medical Association* for publishing articles whose authors failed to declare conflicts of interest (New York Times, 2006). The media had an important role in publicising Hwang Woo-Suk's fraudulent stem cell research (BBC, 2006). *Health-e*, a South African health news reporting agency, exposed the deaths that occurred on the illegal trial of Dr. Matthias Rath, an AIDS denialist who

convinced people with advanced HIV disease to take high dosage multivitamins instead of antiretrovirals. All these cases are excellent examples of what the mainstream media can do well. In none of the above examples, is scientific consensus challenged.

The consensus principle is not able to eliminate all forms of poor scientific reporting. Jamie Doran's written article for the BBC website cited above does not fall foul of the consensus principle, because it does not directly challenge the scientific consensus that HIV causes AIDS. It was however biased and poorly researched. The burden of fact-checking and editorial scrutiny are definitely not eliminated by the consensus principle.

Exceptions To The Consensus Principle

It is of course conceivable that an evidence based challenge to the scientific consensus that turns out to be correct might be published in the mainstream media before it is accepted in the scientific literature. It is conceivable that a scientific clique, in order to protect its interests, blocks the publication of research by a rival scientist in scientific journals such that the only route open to the scientist is to go to the mainstream media. Therefore, the principle is prefixed with the phrase *unless there are highly exceptional circumstances*. But the probability of these events occurring *and* a mainstream media publication having the skills to report appropriately on a scientific finding that overturns scientific consensus are remote. So editors should be extremely cautious before running such reports. If an editor believes that a fringe scientific minority view must be given space, then he or she should publish it but to avoid being the source of public misinformation. A recognised representative of the scientific consensus position should be commissioned to produce a response with at least equivalent space, time and prominence for the same publication or production.

Recommendations For Scientists

Science is under attack on many fronts. This is not a new phenomenon. Indeed, we need only recall the cases of Bruno, burnt at the stake, and Galileo, gaoled and threatened with torture by the inquisition to see that the promotion of pseudo-science has a long history. Charles Mackay's famous book, *Extraordinary Popular Delusion and The Madness of Crowds*, published in

1841, documents the extent to which pseudo-science was rife in his era, and Martin Gardner did likewise in the 1950s and the 1980s (Gardner, 1957; 1981).

It is plausible that the popularity of pseudo-science continues partly as rebellion to the perceived authority and arrogance of scientists, as well as the alienation many people feel from science and technology because they cannot understand it, probably due to inadequate science education. Indeed, science in so many fields has become so specialised and technical that the era of the polymath is gone.¹⁸ Hardly anyone can claim to have an expert knowledge of multiple scientific fields today. Even people with extensive scientific training regularly encounter technologies and theories they do not understand. Another factor is the Internet. It brings many advantages: it gives much needed space to marginalised and oppressed voices and it allows people without access to the mainstream media to expose cases of corruption and folly. However, it is also a forum where all types of unproven and absurd ideas are expressed with great confidence and often with superficially compelling evidence and authority. It is hard to say whether the ascendant position of science in society is truly in danger. But even if we are optimistic, it is plausible that the popularity and understanding of science will not increase unless scientists take measures to do so.

Some scientists do speak out consistently against pseudo-science. But responding to nonsense needs to become the norm amongst scientists working in fields attacked by pseudo-scientists. In medical fields, where pseudo-scientific claims endanger lives, this is particularly important. Medical researchers need to devote time to explaining to non-scientists how new medicines are researched and how the causes of diseases are determined. Scientists at academic institutions must be encouraged to bring understanding of their research to ordinary people.

Currently there are few incentives for this to happen. Career advancement in the vast majority of universities is primarily based on quality and quantity of research. Incentives need to be created to encourage more scientists to teach their work. High quality teaching, not only of university students but also to the general public, should be rewarded and seen as a substitute for at least some research output. Not all academics are good at teaching, but many are and encouraging them to teach to the general public, by writing newspaper articles, giving public talks, writing books or pamphlets for laypeople would likely

18 Thank you to John Moore for making this point to me.

improve public understanding of science and discourage pseudo-science. Perhaps one way to do this would be to set up a peer review mechanism, akin to the structure for reviewing journal articles, but that instead reviews the public education efforts of university academics. This could be associated with a reward system for determining promotions, tenure and professorships.

Furthermore, scientists in fields prone to pseudo-science intrusion, e.g. cancer and AIDS research, should establish formal bodies for generating easily understood responses to false claims as soon as they may appear. In AIDS a group of scientists and activists have established a website, www.aidstruth.org, with this very objective. However, all the contributors donate their time and the frequency and quality of the website's response to new nonsense about AIDS is dependent on the schedules and energy of already overworked individuals. Furthermore, a website is by itself inadequate to combat pseudo-science: public meetings, addressing school students, pamphlet distribution and contributing to newspapers and radio and television programmes are also necessary. This can only be achieved on a sufficiently large scale if formal institutions with funding are established with the purpose of providing scientifically accurate and authoritative public education.

Community Involvement Is Essential

In South Africa, the Treatment Action Campaign has run a massive treatment literacy programme. This involves training members of communities affected by AIDS on the science of HIV. The trained people become trainers themselves and give workshops on the science of AIDS to businesses, unions, TAC branches, at community meetings and in clinics. This has been critical to countering the ascendancy of state-supported AIDS pseudo-science in South Africa. It would not have been possible without the assistance of HIV scientists. And it would be even more effective if more scientists assisted the TAC. Scientists need to work with community initiatives because by creating community leaders who are also science proponents, many more people can learn about science.

Scientists Can Make A Difference

Recently over 80 scientists wrote a joint letter to President Mbeki urging him to remove pseudo-science from South Africa's response to AIDS (Abdool Karim *et*

al., 2006). The letter contributed to the positive changes in the South African government's approach to the epidemic that is taking place at the time of writing. With regard to global warming, scientists are also making their voices heard with greater power. On 4 September 2006, Bob Ward on behalf of the Royal Society sent a letter to Nick Thomas, Director of Corporate Affairs for Esso, the United Kingdom arm of ExxonMobil (Ward, 2006; Adam, 2006). Ward criticised ExxonMobil for funding various advocacy groups sceptical of global warming. Interestingly, the response to Ward has been similar to the ones of O'Neill, *The Economist* and Welz described above. Philip Ball published an editorial in *Nature* in defence of Ward. He wrote:

‘[O]nce [Ward's] letter was published by the British Guardian newspaper, the Royal Society was denounced from all quarters as having overstepped its role as an impartial custodian of science. ... David Whitehouse, formerly a science reporter for the BBC, subsequently wrote his own letter on the subject, which also wound up online: 'My disquiet about this is ...about the nature of the debate and the role of the Royal Society in it and the sending of such a hectoring and bullying letter demanding adherence to the scientific consensus,' he wrote. 'Is it appropriate that it should be using its authority to judge and censor in this way?’

Ball also quotes Roger Pielke, director of the University of Colorado's Center for Science and Technology Policy Research in Boulder, who wrote ‘The actions by the Royal Society are inconsistent with the open and free exchange of ideas, as well as the democratic notion of free speech.’

Ball argues forcefully that Whitehouse and Pielke are wrong. He draws a comparison between the response of the *Royal Society* to ExxonMobil and *Nature's* response to Neville Hodgkinson's AIDS denialism in the *Sunday Times*:

‘On that occasion, *Nature* invited accusations of scientific censorship by standing up to the *Sunday Times*' programme of misinformation ...making me proud to be working for the journal. As I recall, the Royal Society remained aloof from that matter ...We should be glad that it is now apparently ready to enter the fray. Challenging powerful groups that distort science for personal, political or commercial reasons is not censorship, it is being an advocate for science in the real world.’

Running pseudo-scientific pieces in the mainstream media is poor and unethical journalism. Where pseudo-scientists encourage dangerous health decisions,

there are strong arguments, consistent with the way modern democratic societies understand free expression, that their speech should not be protected. However, censorship or legal punishment is very seldom the appropriate way to respond to even these worst cases of pseudo-science, either strategically or ethically. Pseudo-scientific beliefs are prevalent and will consequently continue to be given space in mainstream media publications. The best way to limit the effects of pseudo-science in the media is by improving the science education of journalists and editors, encouraging editors to adopt a principle of being extremely cautious before running articles disputing scientific consensus and encouraging scientists to teach the public their fields and counter pseudo-science when it appears in the media. With time, it is plausible that such efforts will help create an ethos of scientific accuracy in the media and a more rational society.

Appendix One: Advertising And Broadcasting

Many democracies regulate expression to a much greater degree than noted in the essay. In South Africa there are a number of institutions that regulate, either with statutory or self-regulatory powers, expression. For example, there is the BCCSA, two of whose decisions were discussed in the essay. It adjudicates complaints against holders of broadcast licenses. Its code and rulings include sanctions against expression that go beyond the Harm Principle. For example, it outlaws paying criminals for information and has ruled against organisations for insulting religious sensibilities. Interestingly, Mill, in *On Liberty*, defends a man who was imprisoned for writing an anti-Christian message on a gate. Even access to broadcasting in South Africa is regulated by the Independent Communications Authority of South Africa (ICASA). The United Kingdom has a similar body. It is an interesting debate as to whether ICASA and the BCCSA's code and authority are too wide-ranging, but this is beyond the scope of this discussion.

However, one particular issue that is of important consideration is advertising, because unsubstantiated claims about medicines in advertisements have been banned in several recent rulings in South Africa. The Treatment Action Campaign has been the complainant in some of these and I therefore wish to explain why regulating advertising is not in breach of Mill's principles and is an acceptable control of expression.

None of the United States, United Kingdom or South Africa give commercial speech the same freedom as other expression. For example, the US Food and Drug Administration, the Advertising Standards Authority of South Africa (ASASA) and the British Advertising Standards Authority have all issued findings or warnings against Matthias Rath for making unsubstantiated claims about medicines. In the South African case his advertisements claimed that antiretrovirals are toxic and that micronutrients alone reverse the course of AIDS.¹⁹ Also, all three countries restrict tobacco advertising. Making unsubstantiated advertising claims is not protected. What makes commercial speech different such that it is not given the same protection as other expression? Indeed, is this an inconsistency? Should commercial speech be given equal protection to other forms of expression? In particular does ASASA

19 Declaration of interest: I, acting on behalf of the Treatment Action Campaign, was involved in the complaint lodged with the Advertising Standards Authority of South Africa against Matthias Rath.

devalue freedom of expression by ruling against advertisers who make unsubstantiated claims?

To answer this question adequately, it should first be noted that ASASA is primarily a self-regulating authority. Its decisions are only binding on institutions that voluntarily abide by its decisions. This includes most South African publishers. There is one exception: ASASA rulings are legally binding on broadcasters. Hence there is a division in the regulation of the content of broadcast material: the BCCSA rules on programme content and ASASA rules on advertising.

Self-regulation of expression is an entirely different matter from state enforced control of expression. Self-regulation is a voluntary effort by publishers to meet an agreed upon quality standard. If a publisher wishes to run advertisements which ASASA has ruled must be withdrawn, it is the prerogative of the publisher to withdraw its membership of ASASA.

Nevertheless, the question is somewhat more complex than this. Broadcasters are legally obligated to abide by the ASASA code and there is also South African legislation making it an offence to make false claims about medicines in advertisements (in which advertisements are quite widely defined). Furthermore, it is probable that if the advertising industry was not self-regulated, there would be a successful public demand for advertising to be much more regulated than it currently is through legislation. Similar legislation exists in the United Kingdom, United States and elsewhere. As argued above, such claims do fall foul of the Harm Principle and so it is not a breach of Mill's principles to outlaw them. A question that arises from this however is why is there a differentiation between advertising, or commercial expression, and other forms of expression?

The answer must be that if commercial speech was not regulated, especially with regard to the truth of its content, there could be very grave consequences for society. False messages, determined not by genuine belief but by vested interests, would have undue influence and could dominate public actions. Furthermore, the issue is about space for expression, not expression itself. The back page of, say, *Time* magazine and the adverts during a popular soap opera are clearly more valuable and have more influence than an arbitrary website run by 'Jane Doe'. Nothing prevents a paid-for advert being distributed as a non-paid advert on, say, a private internet site or as a pamphlet. But once advertisement space is purchased, the advertiser gains access to a premium and exclusive means of influence, thereby justifying stricter standards. Mill was a

utilitarian and his principles were designed to enhance society's happiness. If a situation arises in which a form of expression, because it is unregulated, leads to less happiness, a utilitarian position indicates that it is then justified to regulate it.

Another argument for differentiating between advertising and other expression has been suggested to me. The principal justification for the differentiation lies in the expressive and autonomy-enhancing qualities of non-commercial speech, even when emanating from corporations, whereas when the speech is not expressive but transaction-directed, those justifications for its protection are absent. Thus Mill's 'free market of ideas' needs reinforcement with legislative inhibition on untruth.²⁰

This complex issue, however, requires much further discussion and debate.

20 Personal correspondence with Edwin Cameron.

References

Adam, D. 2006. *Royal Society tells Exxon: stop funding climate change denial*.
Last accessed 01/11/2006

American Association for the Advancement of Science. 2002. *AAAS Board Resolution Urges Opposition to 'Intelligent Design' Theory in U.S. Science Classes*.

<http://www.aaas.org/news/releases/2002/1106id.shtml>.

Last accessed 04/02/2007

Barnett, T., Prins, G., Whiteside, A. 2004. Aids denial costs lives: three experts in aids research, Tony Barnett, Gwyn Prins and Alan Whiteside, say that Rian Malan has placed lives in danger with his sceptical approach to the epidemic. *The Spectator*, 25/09/2004.

BBC. 2006. *Profile: Hwang Woo-suk*.

<http://news.bbc.co.uk/2/hi/asia-pacific/4554704.stm>.

Last accessed 31/10/2006

BCCSA. 2005a. *'Positive talk show' with title: 'What if everything you knew about HIV and AIDS is wrong?' on 4 April 2005 at 19:30*. Adjudication No. 11/A/2005.

BCCSA. 2005b. Case No: 2005/56 702 Talk Radio - *Tim Modise Show* - Views on HIV and Aids.

http://www.bccsa.co.za/templates/judgement_template_320.asp.

Last accessed 16/10/2006.

BCCSA. 2006. Case No: 2006/07 702 Talk Radio - Appeal - *Tim Modise Network* - Public Importance.

http://www.bccsa.co.za/templates/judgement_template_336.asp.

Last accessed 16/10/2006.

Beckerman. 2006. Harper's Races Right Over the Edge of a Cliff. *Columbia Journalism Review*, 8 March 2006.

http://www.cjrdaily.org/behind_the_news/harpers_races_right_over_the_e.php.

Last accessed 07/12/2006

Bergman, J. 2005. *Let's defend Incarnation Children's Center from HIV denialists*. Housing Works AIDS Issues Update, 24/5/2006.

http://www.hwadvocacy.com/update/archives/2005/05/guestview_denia.html.

Last accessed 07/12/2006

Boykoff J., and Boykoff, M. 2004. *Journalistic Balance as Global Warming Bias: Creating controversy where science finds consensus*.

<http://www.fair.org/index.php?page=1978>.

Last accessed 07/12/2006.

Brits, E. 2005. Burglars 'peed' on Aids records. *Die Burger*, 30/5/2005.

http://www.news24.com/News24/South_Africa/Aids_Focus/0,,2-7-659_1713547,00.html.

Last accessed 07/12/2006.

Cummings, D., 2006, *'Free Speech' is more than a slogan*.

<http://www.spiked-online.com/index.php?/site/article/1906/>.

Last accessed 31/10/2006.

Discover, 2006. *Reviews*.

<http://www.discover.com/issues/nov-06/departments/reviews/?page=2>.

Last accessed 30/11/2006.

Doran, J. 2004. *New York's HIV experiment*. BBC, 30/11/2004.

http://news.bbc.co.uk/2/hi/programmes/this_world/4038375.stm. Last accessed 7/12/2006.

Dorrington, R., Johnson, L., Bradshaw, D., Daniel, TJ. 2006. *The Demographic Impact of HIV/AIDS in South Africa: National and Provincial Indicators for 2006*.

Durant, J. 1994. A war of words. *BMJ*; 308 (15 January 1994): 210-211.

Economist, The. 2001. *The 'skeptical environmentalist'*. 6 September 2001.

http://www.economist.com/books/displaystory.cfm?story_id=E1_SSDSGV.

Last accessed 31/10/2006.

Economist, The. 2002a. *Defending Science*. 31 January 2002.

http://www.economist.com/printedition/displaystory.cfm?story_id=965718.

Last accessed 31/10/2006.

Economist, The. 2002b. *The Litany and the Heretic*. 31 January 2002.
http://www.economist.com/displayStory.cfm?Story_ID=965520.
Last accessed 31/10/2006.

Economist, The. 2003. *Thought Control*. 9 January 2003.
http://www.economist.com/printedition/displayStory.cfm?Story_ID=1522706.
Last accessed 31/10/2006.

Economist, The. 2006. *The Heat is On*.
http://www.economist.com/surveys/displayStory.cfm?story_id=7852924.
Last accessed 31/10/2006.

Farber, C. 2006. Out of Control, AIDS and the Corruption of Medical Science.
Harper's Magazine, March 2006.

Foley, 1996. *NBC's 'The Mysterious Origins of Man'*.
<http://www.talkorigins.org/faqs/mom.html>. Last accessed 31/10/2006.

Gallo, R., Geffen, N., Gonsalves, G., Jefferys, R., Kuritzkes, DR., Mirken, B.,
Moore, JP., Safrit, JT. 2006. *Errors in Celia Farber's March 2006 Article in
Harper's Magazine*.
<http://www.tac.org.za/Documents/ErrorsInFarberArticle.pdf>.
Last accessed 07/12/2006.

Gardner, M. 1957. *Fads and Fallacies in the Name of Science*. New York:
Dover Publications.

Gardner, M. 1981. *Science, Good, Bad and Bogus*. New York: Prometheus
Books.

Geffen, N. 2004. *Rian Malan Spreads Confusion about AIDS Statistics*.
http://www.tac.org.za/newsletter/2004/ns20_01_2004.htm.
Last accessed 07/12/2006.

Geffen, N. 2005. *Founding affidavit in TAC versus Rath and Others*. http://www.tac.org.za/Documents/Court_Cases/Rath/Interdict/Geffen-1.pdf. Last accessed 08/12/2006.

Geffen, N. 2006a. *Echoes of Lysenko: State-sponsored pseudo-science in South Africa*. CSSR Working Paper No. 149. Centre for Social Science Research, University of Cape Town. <http://www.cssr.uct.ac.za/papers/wp149.pdf>. Last accessed 07/12/2006.

Geffen, N. 2006b. *HIV and accuracy in the South African media*. Presentation to 13th International AIDS Conference, Toronto. <http://www.aidstruth.org/HIVMediaTorontoAIDSConference-20060613.ppt>. Last accessed 07/12/2006.

Harland, R. 2006. Letter to the Citizen published under the heading *Rasnick sets the record straight* but this heading refers to Rasnick's response to Harland. The Citizen, 07/04/2006. Retrieved from cache at <http://72.14.203.104/search?q=cache:OC3QgTIMjFcJ:www.citizen.co.za/index/Article/211943.page+david+rasnick+richard+harland&hl=en&gl=us&ct=clnk&cd=1>. Last accessed 07/12/2006.

Heywood, M. 2004. *Price of Denial*. Development Update 5(3). Interfund.

ICTR. 2006. *Joseph Serugendo sentenced to six years imprisonment*. <http://69.94.11.53/ENGLISH/PRESSREL/2006/478.htm>. Last accessed 09/01/2007.

Intergovernmental Panel on Climate Change. 2007. *Climate Change 2007: The Physical Science Basis. Summary for Policymakers*. <http://www.ipcc.ch/SPM2feb07.pdf>. Last accessed 04/02/2007.

Johnson, L. 2006. *AIDS denialists must do their homework*. The Citizen, p. 13, 07/12/2006.

Keeble, R. 2001. *Ethics for Journalists*. Routledge, London and New York.

Kim, R. 2006. Harper's Publishes AIDS Denialist. *The Nation*, 02/03/2006.
<http://www.thenation.com/blogs/notion?pid=65330>.
Last accessed 07/12/2006.

Kruglinski, S. 2006. *Questioning the HIV Hive Mind? An interview with Celia Farber, long-serving chronicler of HIV dissidents.*
<http://www.discover.com/web-exclusives/celia-farber-interview-aids/>
Last accessed 30/11/2006.

Lomborg, B. 2001a. *The truth about the environment.* 2 August 2001.
http://www.economist.com/displayStory.cfm?Story_ID=718860.
Last accessed 31/10/2006.

Lomborg, B. 2001b. *The Skeptical Environmentalist.* Cambridge.

Malan, R. 1991. *My Traitor's Heart.* Vintage.

Malan, R. 2001. In Search of the Truth. *Rolling Stone Magazine*, 22 November 2001.

Malan, R. 2003a. Africa isn't Dying of AIDS. *The Spectator* 13-20 December 2003.

Malan, R. 2003b. Apocalypse When. *Noseweek*, December 2003/January 2004.

Mbeki, T. 2004. *State of the Nation Address of the President of South Africa, Thabo Mbeki:* Houses of Parliament, Cape Town 6 February 2004.
<http://www.info.gov.za/speeches/2004/04020610561002.htm>.
Last accessed 07/12/2006.

Mhlongo, S. and Rasnick, D. 2006. No HIV risk for heterosexuals. *The Citizen*, p. 12, 07/04/2006.

Mill, J. 1859. *On Liberty.* The Library of Economics and Liberty.
<http://www.econlib.org/library/Mill/mlLbty.html>.
Last accessed 02/11/2006.

Miller, L. 2006. An Article in Harper's Ignites a Controversy Over H.I.V. *New York Times*, 13 March 2006.

<http://www.nytimes.com/2006/03/13/business/media/13harpers.html?ex=1165640400&en=f7241a53f6a1546e&ei=5070>.

Last accessed 07/12/2006.

Nattrass, N. 2006. *AIDS, Science and Governance: The battle Over Antiretroviral Therapy in Post-Apartheid South Africa.*

<http://www.aidstruth.org/nattrass.pdf>.

Last accessed 07/12/2006.

New York Times, 2006. *Our Conflicted Medical Journals.*

<http://www.nytimes.com/2006/07/23/opinion/23sun2.html?ex=1165122000&en=9f0581c5a87773bc&ei=5070>.

Last accessed 01/12/2006.

NICUS, 2006. *HIV: Should we review our current recommendations and prescribe food combinations?*

http://webhost.sun.ac.za/nicus/Factsheets/HIV_alternative_diet_therapy.htm.

Last accessed 05/12/2006.

NIH, 2003. *The Evidence that HIV Causes AIDS.*

<http://www.niaid.nih.gov/factsheets/evidhiv.htm>.

Last accessed 05/12/2006.

O'Neill, B., 2006. Global warming: the chilling effect on free speech. *Spiked*, 6 October 2006.

<http://www.spiked-online.com/index.php?/site/article/1782/>.

Last accessed 01/11/2006.

Oreskes, N. 2004. Beyond the Ivory Tower: The Scientific Consensus on Climate Change. *Science* 3 December 2004: Vol. 306. no. 5702, p. 1686.

<http://www.sciencemag.org/cgi/content/full/306/5702/1686>.

Last accessed 09/01/2007.

Oreskes, N. 2006. *Consensus in Science: How Do We Know We're Not Wrong?*

<http://olli.ucsd.edu/images/lecture2.ppt>.

Last accessed 08/12/2006.

Padian NS, Shiboski SC, Glass SO, Vittinghoff E. 1997. Heterosexual transmission of human immunodeficiency virus (HIV) in Northern California: results from a ten-year study. *Am J Epidemiol* 1997;146:350-7.

Padian, NS. 2006. Heterosexual sex truly CAN give you HIV. *The Citizen*, 11/04/2006.

<http://www.citizen.co.za/index/article.aspx?pDesc=15778,1,22>.

Last accessed 07/12/2006.

SABC. 2005.

SABC Television Guide.

http://www.sabctv.co.za/content/programdetail.asp?ch_id=3&p_id=14647&s_id=4790380.

Last accessed 31/10/2006.

Scientific American. 2002. *Misleading Math about the Earth*. January 2002 issue.

<http://www.sciam.com/article.cfm?articleID=000F3D47-C6D2-1CEB-93F6809EC5880000&pageNumber=1&catID=2>.

Last Accessed 07/12/2006.

Society of Professional Journalists. 1996. *Code of Ethics*.

<http://www.spj.org/ethicscode.asp>.

Last accessed 08/12/2006.

Stanford Encyclopedia of Philosophy. 2002. *Freedom of Speech*.

<http://plato.stanford.edu/entries/freedom-speech/>.

Last accessed 02/11/2006.

Treatment Action Campaign. 2005. *Analysis of deaths on Matthias Rath illegal clinical trial*.

http://www.tac.org.za/Documents/ns02_11_2005.htm.

Last accessed 09/01/2007.

Treatment Action Campaign. 2006. *TAC statement on the death of Nozipho Bhengu*.

<http://www.tac.org.za/nl20060524a.html>.

Last accessed 05/12/2006.

Thom, A. 2005. *Rath foundation conduct illegal experiments*.

<http://www.health-e.org.za/news/article.php?uid=20031294>.

Last accessed 09/01/2007.

UNAIDS. 2006. *AIDS Epidemic Update*.
http://data.unaids.org/pub/EpiReport/2006/2006_EpiUpdate_en.pdf.
Last accessed 05/12/2006.

Venter, F. 2006. Spend more time on research, not litigation. *The Citizen*, 05/05/2006.
<http://www.citizen.co.za/index/article.aspx?pDesc=16652,1,22>.
Last accessed 07/12/2006.

Ward, B. 2006. *Letter to Nick Thomas*.
<http://image.guardian.co.uk/sys-files/Guardian/documents/2006/09/19/LettertoNick.pdf>.
Last accessed 01/11/2006.

Welz, M. 2004. The Tenets of AIDS. Editorial in issue 54 (February 2004) of *Noseweek*.

World Health Organisation. 2003. *Natural History of HIV Infection in HIV/AIDS in Asia and the Pacific Region 2003*. pp. 85-88.