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Not how, but who –  
Reaching new audiences with science  
documentary film

**Roland Kahurangi Payne**

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Centre of Science Communication, University of Otago, Dunedin,  
New Zealand

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## **Abstract**

The commercialisation of television has made audience ratings one of the key drivers of the modern science documentary format. This has been heavily criticised by the science community for undermining the traditional knowledge and information goals of the format. However, entertainment driven programmes are attracting new audiences to science documentaries and the internet has created new pathways for knowledge distribution. This has changed the way people can learn and interact with television documentaries and introduced new opportunities for tangential learning through non-educational programmes. By approaching science communication in documentary film from the aspect of (target) audience first and information second there are opportunities to reach new, and/or previously unreceptive audiences. The 'voice' of the target audience is examined as a starting point for this approach, in relation to climate change documentaries and attitudes towards them in New Zealand. This approach is examined further in the creative component of this thesis, the documentary film *Gone Curling*. It is suggested that the effectiveness of the methods used are explored further and that scientists and science institutions work to encourage learning links to all levels of documentary film and television programming.

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*'Lang may yir lum reek'*

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# 1 Introduction

Science and the media have a long and complex relationship. Scientists have a history of using media sources to publish their ideas and gain public support and funding for their research. As the media evolved from print media, into radio, television and the internet, the science community found ways of gaining a foothold in these media as well and using them to publicise their ideas. In regard to television this was traditionally done through news and current affairs programmes and the factual, science-based documentary format. These programmes utilised a 'voice-of-god', 'or voice-of-authority' style delivery that viewers trusted and this 'matter-of-fact' style became synonymous with science and natural history documentaries.

The commercialisation of television broadcasting, in both the United Kingdom (UK) and the United States (US), in the latter part of the 20<sup>th</sup> century, not only removed much of the traditional funding streams, it also weakened the influence the science community had on television programmes (Zoellner 2010). The documentary genre, which had seldom attracted large audiences, was forced to adapt and become more popular (Zoellner 2010). Entertainment driven documentary subgenres such as, docu-soaps and reality-television (TV), proved to be both successful and cheap to produce, and some science documentaries began to adopt similar, dramatic styles. This in turn resulted in significant criticism from scientists towards the broadcasters, claiming that science reporting and representation in documentary has been 'dumbed down' by the media (Davies 2002).

There is no doubt that a significant number of documentaries that are labelled as 'science' are often very thin on facts, heavily dramatized, misleading and sometimes nothing short of pseudoscience or worse (Radford 2007). However, science programming is now more popular than ever, landmark science programmes are attracting five to ten times the audience numbers they were 30 years ago (Davies 2002). They are reaching wider audiences and

audiences that may not have ever been interested in science and factual based films in their traditional formats.

The internet has also changed the way audiences can access science documentaries and in some cases enabled them to interact and learn more about particular programmes they have watched. This presents diverse and sometimes indirect opportunities for science communication in documentary film.

There are many well-known quotes and clichés that purport the wisdom that you cannot please everyone and there are horses for courses, and so on. The most famous of these is probably the quote popularly attributed to Abraham Lincoln:

*'You may fool all the people some of the time and some of the people all the time, but you can't fool all of the people all the time'* (Sandburg 1957).

Although in this quote he is talking about fooling people the basic formula can be written:

*'You can X Y of the people Z of the time'* ("Talk:Abraham Lincoln" 2013).

If you apply this wisdom to science communication in documentary film it tells us that science documentaries may reach a large audience sometimes, but most of the time their audience will be limited. Science documentaries do not always have a wide appeal yet with different structuring they can appeal to a variety of audiences. The question for science communication in documentary film should perhaps be not one of 'how', but 'who'. Who is the audience that we want the information to reach?

This thesis examines a concept for reaching new audiences with science communication in documentary film, through selecting the right 'voice' for the audience.

## ***1.1 Why is it Important to Communicate Science?***

Science communication and science literacy is essential to our understanding of the natural and physical world. It allows us to make informed decisions about how natural resources are used and cared for, to ensure healthy functioning ecosystems that provide food and other resources that we depend on for our existence and well being. Finding ways to reach wider audiences, with regards to the environmental impact that climate change is having on our planet, is increasingly urgent, if we are to reverse the loss that continuing global warming will have on biodiversity and the ecosystems that support us.

## ***1.2 Limitations of Research***

This thesis examines the different ‘voices’ that can be attributed to different modes of documentary film and contrasts them with the ‘voice’ and language of science and science documentaries and in particular those on the issue of climate change. It examines the conflicts that can occur between the documentary modes and science communication. It also examines some of the indirect ways that science communication can occur when using different modes of documentary. Finally this thesis aims to further understanding of how documentary films can be made to attract new audiences. It does not survey actual audience reactions to films, but examines information from existing sources and draws conclusions.

## ***1.3 Defining the terminology***

The documentary genre is wide and diverse and many of the modern-era television subgenres, which are now often referred to as genres in their own right, have challenged our understanding of what is documentary. The seeming slipperiness of the genre has led a number of theorists and commentators to use the term ‘non-fiction film and television’ in an attempt to broaden the classification (e.g. Beattie 2004; Barnouw 1993). With documentary seen as a genre within this classification. The term factual film / television (or films of

fact) has also been used when in reference to the wider grouping of science, history and natural history documentaries (e.g. Boon 2008; NHNZ 2013).

For the purposes of this thesis, however, the term 'documentary' will be used to refer to the wider group of documentary film and television programmes, including the various subgenre (or genre) labels used for many of the modern television formats, such as, 'docussoap', 'reality TV' and 'ob-doc' (observational documentary) etc.

The term 'science documentary' will be used to refer to the wider group of all film and television productions that have a science-based message. Science being defined in the Oxford English Dictionary (Oxford Dictionaries 2013) as:

*"the intellectual and practical activity encompassing the systematic study of the structure and behaviour of the physical and natural world through observation and experiment"*.

## 2 The Voice of Documentary Film

Documentary films represent the historical world through sounds and images chosen by the filmmaker to represent his or her point of view and as such represent one voice among many in a particular debate or field (Nichols 2001). Nichols describes the voice of documentary as the way in which it seeks to persuade us of a particular view:

*Documentaries seek to persuade or convince us: by the strength of their argument or point of view and the appeal, or power, of their voice. The voice of documentary is the specific way in which an argument or perspective is expressed.* (Nichols 2001).

Nichols defines voice as something narrower than style: it is the way the filmmaker chooses to deliver information to the viewer. It is how the film speaks to us and how the information is presented to create the 'tone' or 'texture' of the film (Nichols, 2006). Or, as Beattie (2008) describes it, 'it is the central organising principle around which the documentary text is constructed' (Beattie 2008, pg 11).

Voice in documentary is the way (or ways) a filmmaker chooses to use, to connect with their target audience. It is the script and structure of the film, but it is broader than just narration, spoken words and commentary. It includes all the decisions made when shooting and editing a film, such as when to cut, how to frame a scene and how images are juxtaposed in the edit, how the sound is recorded and what sound effects are added later for effect (Nichols 2008). The use of all of these elements in constructing the film means that the argument or point of view being put forward can be made more or less explicit (Nichols 2001)<sup>3</sup>.

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<sup>3</sup> For a full description of voice and style in documentary film see Nichols (2010), Introduction to Documentary, Chapter 3

The voice in many documentaries can also be viewed in the tradition of rhetoric, especially on issues where there is debate such as politics, planning, or economic growth (Nichols 2010). Aristotle's rhetorical traditions provide a foundation for using reason, emotion, and credibility in support of an argument, which Aristotle called Logos, Pathos and Ethos and are often referred to as rhetorical proofs (Griffin 2008).

- Logos is the logic and reasoning used to support a claim, which includes the facts and statistics used to help support the argument.
- Pathos is the use of emotional or motivational appeals in support of an argument, including vivid imagery, emotive language and sensory appeals.
- Ethos is the credibility of the source; the speaker or author, or the authority they draw on to support their claims.

(After, Ramage & Bean 2010)

In this way the voice in documentary can be seen to draw on all three of Aristotle's 'proofs' and the emotional appeal, or speaker's creditability can sometimes be more important than the evidence, when persuading the audience of an idea, or argument (Griffin 2008).

## **2.1 Documentary Modes**

Every documentary has a voice of its own. It comes through the film's orator(s) and is most commonly the voice the filmmaker gives to the film, be it their own, or the film's subjects (Nichols 2005). However, it can also be the film's sponsors or producers. The voice can be subtle and poetic, without rhetoric, like Ron Fricke's *Samsara* (2011) or authoritarian and didactic, as seen in many of the WWII propaganda films, like Frank Capra's *Why We Fight* series (1942).

The Auteur Theory of cinema examines individual voices, while Genre Theory examines shared voices (Nichols 2006). Genre Theory considers the qualities that characterise certain types of films and filmmakers and provides a useful toolset when deconstructing documentary film. Bill Nichols has theorised that the Documentary Genre can be broken down into at least six subgenres; poetic, expository, observational, participatory, reflexive, and performative, which he calls modes (Nichols 2001). Nichols' modes provide a good starting point for dissecting documentary and understanding the different types of voice and how they relate to different audiences.

## ***2.2 Limitations of modes***

Nichols' modes of documentary have been criticised by Stella Bruzzi (2000, 2006) for imposing 'family tree' approach to documentary theory that implies documentary styles have evolved in a Darwinian model. Bruzzi argues this imposes a false chronology and that 'none of the modes expel previous modes; instead they all overlap and interact', suggesting that the compartmentalisation of documentary has become too reductive (Bruzzi 2006). Bruzzi does not however, dispute the chronological development of direct cinema and cinéma vérité and for the purpose of analysing the voice in documentary it is worth considering why the dominant style continues to change over time. As Beattie (2008) points out, Nichols' formation of modes was an attempt to specify the prominent features of different documentary forms, 'not to reify formal components of the documentary tradition' (Beattie 2008, pg 2). Nichols' modes should be seen as the basic building blocks of documentary theory and looked at in the wider context of documentary functions (Beattie 2008). For the purpose of understanding the connection between voice and audience, this means it is still useful to look at documentary development over time and compare popular styles with the events of the day and advances in technology.

### **2.3 Poetry in motion - Poetic Mode**

The poetic mode of documentary represents reality in a series of fragments, juxtaposed images and sounds, incoherent acts and loose associations and the filmmakers' voice comes through the use of image and sound, rather than narration (Nichols 2001). Born out of the silent era of film, early documentaries would often weave image and sound together to create emphases. Poetic documentary remains popular in art-house and cult cinema today, and poetic montage sequences are readily used in modern formats to compress time.

Films of this mode lack a strong sense of rhetoric, yet the style can be used as a powerful persuasive tool as shown in Godfrey Reggio's ground breaking 1983 documentary *Koyaanisqatsi* (Essid, 2004). *Koyaanisqatsi*, a Hopi Indian word meaning life out of balance (David, 2003), was the first of Reggio's three part *Qatsi* series that Reggio says were intended to provoke and 'raise questions that only the audience can answer' ("*Koyaanisqatsi*" 2013). The film juxtaposes human activity with nature in an apocalyptic collision clearly making the statement that the title suggests – our way of life is out of balance.

Bruce Weber's 1987 experimental film *Broken Noses*, about being macho, uses the poetic mode to question aspects of society without having to do so directly. This is done most powerfully in the final scenes of the film where Weber juxtaposes slow motion shots of young boys boxing, with Joni James's haunting and soulful *Too Young* (1959), played over the images.

### **2.4 The Voice-of-God – Expository mode**

Unlike the poetic mode, the expository mode of documentary employs a strong rhetorical framework assembling the images and dialogue in support of the argument Nichols (2001). This was the first thoroughly worked out mode of documentary, first described by pioneering Scottish documentary filmmaker John Grierson (who also invented the word 'documentary' (Curthoys & Lake 2005)), in the 1920s (Nichols 2001). Films of the Griersonian tradition, which Nichols terms the expository mode, employ a very authoritative style of 'direct

address' narration or commentary. These styles of address have become known as the 'voice-of-god' (speaker heard, but not seen) and the 'voice of authority' (speaker seen and heard) (Nichols 2001).

The expository mode became synonymous with WWII era newsreel broadcasts, and government sponsored propaganda films, such as Frank Capra's *Why We Fight* series (1942). As a result this style of film became known for its heavily didactic tones and began a tradition of cultivating richly toned male voices for voice-over narration (Nichols 2008). Although as Bruzzi (2000) points out this was not always the case and many of the most successful films of this era work precisely because they had less polished voices, such as Joris Ivens', *The Spanish Earth* (1937). Ivens initially had Orson Wells read the commentary, but decided it sounded too polished, so he asked Ernest Hemingway to read it instead. Hemingway, who had written much of the script, gave the narration a perception of credibility, precisely because his voice was less polished and more matter of fact (Nichols 2008).

One of the key distinctions of the expository mode is that the narration often leads the images, directing the viewer's attention to the images and informing the viewer of their meaning (Nichols 2010). The narration or commentary can provide us with an interpretation of the historical events on screen and give the appearance of objectivity and distance from the subject. It can also be used to contract sequences, economising time by cutting straight to point of interest, explaining what and why we are looking at something before cutting to the next point of interest: a method that allows the point to be made succinctly (Nichols 2010). For these reasons, the expository mode was adopted by science and natural history films, and has become the standard of these genres. The BBC's highly regarded natural history shows such as *The Blue Planet* (2001) and *Planet Earth* (2006) used David Attenborough's narration to give credibility to the images. Attenborough, who was voted the most trusted man in Britain (McCarthy 2013), brings a level of credibility and a 'truth' claim, to the narration and commentary that fits with Aristotle's idea of rhetorical ethos.

## **2.5 Direct cinema – the Observational Mode**

The development of lightweight portable camera and sound recording technology, after World War II, enabled documentary filmmakers to film without elaborate setups and a new style of journalistic or observational filmmaking began, which was termed direct cinema (Chapman 2009). Driven by a desire for greater cinematic realism, direct cinema, which Nichols would later term the 'observational mode', was based on the idea that documentary films could be objective. As a consequence the 'subjective' storytelling devices of expository mode, such as 'voice-of-god' narration were rejected as 'false' (Bruzzi 2000).

The ideology of the observational mode was that filmmakers could just observe what was happening in front of the camera, without intervention, in a 'fly on the wall' approach (Nichols 2001). Thus the 'voice' in these films could be that of the subject not the filmmaker. The filmmaker tries to remove their 'subjective' voice from the film to allow the 'objective' voice of the subjects to speak for themselves (Bruzzi 2006). These films try to capture the action spontaneously and all forms of control that were dominant in the poetic and expository modes, such as arrangement, staging, scene direction etc., are sacrificed in pursuit of objective truth (Nichols 2001).

Both theorists and filmmakers quickly dismissed the 'truth' and objectivity claims of the voice in the observational mode. The problem for these films was that they didn't necessarily achieve the things their exponents claimed (Bruzzi 2006). The moment a camera is introduced, things can start to become contrived. The filmmaker has to choose what to film, who to film, and how to frame. Then there is the question of indirect intrusion; do people behave differently when there is a camera present and act in ways that would make them look better, or worse (Nichols 2001)?

Yet despite all the arguments mounted against it the observational mode has remained extremely influential. By merging its core concepts with elements of other documentary modes, the 'ob-doc', 'docusoap' and other 'reality television' modes of observation documentary have been developed (Bruzzi 2006).

## **2.6 Cinema Verite – the Participatory mode**

Cinéma vérité was developed in France around a similar time to direct cinema and also sought a greater cinematic ‘truth’. Like direct cinema, cinéma vérité had a disdain for the constructed and subjective techniques of the expository mode and the two styles have often been confused by commentators (Bruzzi 2000). However, while they both have a journalistic style they approach things in almost opposite ways (Nichols 2001).

Cinéma vérité, which translates to ‘truth film’, is what Nichols now terms the participatory mode. Filmmakers who developed this style of filmmaking believed that cinematic truth or purity would be better achieved if at least some of the production techniques used were relived on screen (Chapman 2009). So in this mode the filmmakers actually participate in the film, in every way similar to other subjects, or nearly so. The fact that they hold a camera, as Nichols (2001) points out, gives them a degree of potential power. Therefore, the ‘truth’ claim in these films comes from the interaction that takes place because the camera is there to record it, which differs from the ‘truth’ claim of observational modes that what we see would have occurred even if the camera was not present (Nichols 2001).

The participatory mode can be seen as a form of ethnographic filmmaking where the filmmaker goes to live or becomes immersed in a group to report back what he or she finds (Nichols 2001). Therefore, it is a mode that lends itself to representing ethnic minorities, or insular groups of people, in the style of anthropogenic study. The mode gives a voice to the films' subjects through the interpretation of the filmmakers. This means that methods and practices of social science are usually subordinate to the rhetorical devices of persuasion, as the filmmaker works to impress on the audience a sense of what it’s like to be in a given situation (Nichols 2001).

This mode has become widely used in a number of modern presenter-led documentaries that are attempting to be more ‘real’ and ‘truthful’ than the traditional authoritative style of the expository mode. It has been used in a number of science and natural history documentaries, such as *Tribe* (BBC, 2005 –

2007) and *Man Hunt* (NHNZ, 2011), where the presenter (and film crew) immerses themselves in a local group while filming and by giving feedback to the audience show they are 'really' there. As part of this attempt to be more 'real' the use of shaky, handheld camera footage, is now often maximised, to give the effect of things been filmed as they happen rather than just being set-ups.

These sorts of techniques, which are also used in observational mode documentary, have been incorporated into many of the modern 'reality TV' style formats as well. Other common elements used include catching a boom-mic in shot and keeping the camera rolling when things have gone wrong, or the filmmakers have been told to stop, to show that it is really 'real'.

Yet in an ironic twist for modes that were based around 'truth' claims, the participatory and observational modes have not only been adapted to create the various modern reality t.v. formats, they have also become the preferred style of 'faking it' in the mockumentary vein (Bruzzi 2006). Films such as *This is Spinal Tap* (1984) *Forgotten Silver* (1995), *A Mighty Wind* (2003) and *Borat* (2006) all use participatory and observational documentary styles to make them appear more real or convincing.

## **2.7 Transparency - The Reflexive Mode**

The reflexive mode aims to de-mystify the filmmaking processes and aid the audience in their understanding of the construction of the film by showing the filmmakers in the shooting and editing process (Ruby 2005). Just as the observational mode relies on the perceived absence of the filmmaker to obtain a greater cinematic truth, reflexive mode seeks its truth by revealing the filmmakers and their processes. Yet unlike the participatory mode, which focuses on the interactions between filmmaker and the subjects, reflexive documentaries focus on the interaction between the filmmaker and the audience (Nichols 2001).

If the expository mode has a lecturing or dictatorial voice, the reflexive mode is conversational. The transparency in these films show us difficulties of

representing reality while at the same time try to convince us of their authenticity (Nichols 2001). The self-conscious and self-questioning nature of these films also questions the authenticity of documentaries in general.

In this mode of documentary the 'talking-head' interviews and voice-over narration can still be used to lead the documentary, however, unlike the expository mode, the constructed nature of the interview and narration is exposed. This 'behind the scenes' approach is used to try and convince the audience of the film's authenticity and address the problems of realism in documentaries (Nichols 2001).

## **2.8 Modern Documentary – The Performative Mode**

The performative mode highlights the subjective and expressive nature of documentary by emphasising the often hidden aspects of performance in documentary (Bruzzi 2006). Like the reflexive mode they also highlight and question the constructed nature of documentary, but they take the questioning further. These films favour emotion over objectivity and pose the question of what is knowledge (Childress 2011). They suggest that knowledge is more than just factual information and is in fact something concrete yet based on the specificities of personal experience in the tradition of literature, poetry and rhetoric (Nichols 2001).

This means performative documentaries freely employ 'arty' and expressive techniques such as montage, flashbacks, point-of-view shots, dramatized music and freeze frames to create texture and emotion. Then by mixing these fictional elements with oratorical techniques these films can address social issues that reason and science cannot easily resolve (Nichols 2001). Marlon Riggs' *Tongues Untied* (1989) confronts issues of racism and homophobia by documenting the way a gay, African-American dance group, in New York addresses these issues, within the broader culture. At the same time the film celebrates black men loving each other as a revolutionary act.

Tongues Untied gave a voice to the black gay community in New York, in a way that spoke about *them*, to *themselves*. It was intended as an intellectual intervention to help define the terms, thinking and imagining, that the black gay community in New York were using to collectively identity themselves (Kleinhans 1991). Performative films of this nature can be seen as a counter-balance to many of the participatory films that talk about *themselves* to *us* (Nichols 2001). In this way the treatment of marginalised or minority groups differs from the journalistic style of the participatory mode. As well as, deeply personal and less objective, performative films use elements of 'performance' to create subjective truths and deal with often-sensitive issues (Nichols 2001).

The use of dramatic visual style can also give a voice to the filmmaker allowing them to emphasise their authorship (Bruzzi 2006). Filmmakers such as Nick Barker and Errol Morris are examples of filmmakers that make their authorship explicit through their visual style in a way that would be uncomfortable for traditional documentary filmmakers, as authorship recognises intervention in a genre that was built on truthfulness and transparency (Bruzzi 2006).

## ***2.9 Documentary as Diversion – The Voice of Television***

The bias towards theorising documentary purely as film, deflects attention away from one of the major influences on the documentary form, that of television (Chapman 2009). Television's influence on the voice in modern documentary has been to move away from persuasiveness and instead focus on drama, as entertainment not information is now the goal (Bruzzi 2006). These television formats have no regard for purity or 'discourse of sobriety' that once defined the documentary mode, preferring to focus on sensational subjects such as sex, crime, and conspiracies (Chapman 2009). It is essentially popularised factual entertainment in a style Corner (2000) refers to as 'documentary as diversion', where the primary viewing activity is more aligned to onlooking, eavesdropping and gossiping than analysis and exposition (Corner 2000). Or as

Hill (2007) puts it, the prime concerns in these subgenres are with spectacle, style, emotion and personality.

The developments in reality TV formats through the 1990s and into the 2000s was also linked to developments in technology (Bruzzi 2006). The first digital video (DV) cameras started to become available in 1995 and by the end of 1996 it had become possible to feed the digital footage straight into an AVID editing suite and produce an hour-long documentary (Ellis 2005). This created a new and cheap production pathway from lightweight cameras, enabling longer, more intimate film production and faster editing and post-production times than either film or video (Ellis 2005).

This led to an 'explosion' in the reality TV genre as it expanded into a variety of subgenres including, the 'docussoap' 'ob-doc', 'makeovers', 'game & adventure shows' and celeb-reality (Chapman 2009). Essentially these formats are based on the 'fly on the wall' approach of direct cinema (the observational mode), whilst incorporating elements of reflexive, participatory, or performative documentary (Bruzzi 2006). Then with the addition of comedic or dramatic voice-over narration, fast-cut editing, and intercutting between alternate stories or personalities, a more entertainment-based style of documentary is created (Bruzzi 2006). The key difference in this style however, is that drama and entertainment (and television ratings) were now the drivers of the format, not just devices used to make a documentary more appealing (Corner 2000). For this reason these styles have been accused of undermining traditional documentary formats through an overemphasis on entertainment (Hill, 2007).

This is especially true of the closely related 'infotainment' subgenre, which is information-based media, such as news, current affairs, and science documentaries, with entertainment content added to increase its popularity with audiences (Demers 2005). These programmes, which are often heavily stylized, of poor quality, and ratings driven can be seen to work against the traditional knowledge and information goals of news media and science documentary, by subverting the goal of these genres away from informing citizens and instead treating them as consumers of 'tabloid' TV (Hill 2007).

The effect of this is that the voices that emerge from these modern television documentary subgenres are ones of entertainment and drama (Bruzzi 2006). The developments in reality TV also brought fresh questioning about the 'truth' claims of documentary and showed how slippery the definitions of the genre can be (Ellis 2005). The same can be said of infotainment style programmes, which use effects such as dramatized narration to make stories more entertaining. The very idea of dramatized narration, as pointed out by Fleishman (1992) 'rings with an air of paradox, hinting at a combination of theatre and fiction', which calls into question the truth of information, especially when employed in programmes that deal with news and current affairs. What this highlights is the increasingly blurred line between the non-fiction and fiction genres of film (Chapman 2009).

It is this shift in format and restyling of documentary into an entertainment based medium, which has led to the 'documentary as diversion' tag being given to these subgenres by Corner (2000). Many of the modern science documentaries now fall into this category by using infotainment, 'tabloid' TV formats, which as described by Hill (2007), seem to undermine their own authenticity by focusing on entertainment rather than information.

## 3 The Voice of Science in Documentary

### 3.1 *Scientific Discourse*

Scientific discourse as a conscious style is credited to Sir Francis Bacon, who in his philosophical work *Novum Organum* (1620), called for plain, unembellished writing capable of conveying the truth as directly as possible (Bacon 1944). The Royal Society in Britain quickly adopted this idea and literary flourishes in science were denounced (Sprat 1702).

What followed were generations of scientists who were trained to simplify their writing style, with any evidence of literary embellishment deliberately anaesthetised. With increasing specialisation into more and more sub-disciplines, especially in the last fifty years, scientific discourse has become a language of itself dominated by its own jargon and nomenclature (Montgomery 1989). Expert to expert communication in both texts and spoken language has become restricted to the use of unambiguous and monosemic terms which are non context-dependent (Di Bari and Gouthier 2003).

This style of scientific discourse is however somewhat at odds with popular science communication to the wider public. Communicating ideas to a non-scientific audience (or even a non-specialist audience in some cases) requires the use of more figurative language often employing metaphors, allegories, metonymies and other tropes of rhetoric to elucidate ideas (Di Bari and Gouthier 2003). The use of rhetorical language also highlights another function in these communications that the aim is also to persuade. Scientific research is competitive and public support is needed to maintain funding, therefore, persuading the audience of the merits of the science is crucial (Charlton 1990). This creates an awkward dichotomy – on one hand there is the need to be as objective and unambiguous as possible and on the other a desire to be persuasive and convincing.

### **3.2 Science and Documentary**

Almost all science and natural history documentaries have traditionally used the expository mode of documentary to convey their ideas (Nichols 2010). With its strong rhetorical framework that allows arguments to be well structured, the expository mode has the right framework for scientific discourse. The reliance on the voice-of-god narration and voice-of-authority presenters in these films means they also allow for use of language that even Sir Francis Bacon would have likely deemed appropriate.

In the modern era however, the traditional expository style of science film has undergone some significant challenges. The restructuring of television industries, in Britain and America resulted in more commercial broadcast models being adopted that, especially in Britain, removed a lot of the traditional funding streams for documentary (Zoellner 2010).

Science and factual documentaries had traditionally enjoyed the support of public broadcasters who would fund and distribute their work (Davies 2002). This allowed informative programmes to be made, that were not motivated by obtaining high ratings and selling advertising. However, since the 1990s the liberalisation and commercialisation of Western television production has resulted in growing economic determinism in the industry that forced broadcasters to adapt, and documentaries (whose ratings had never been high), became increasingly dramatized (Zoellner 2009). While some big budget or 'blue-chip' documentaries, such as Attenborough and the BBC's 'Life' series (e.g. *Life in the Freezer* (1993), *The Private Life of Plants* (1995), *The Life of Birds* (1998), etc.) maintained a more traditional voice, many other science documentaries, began to change in the pursuit of ratings. Adopting the dramatic tones of 'reality TV' and blurring the voice of science with entertainment in ways that were more participatory and performative than expository.

### ***3.3 Is The Voice of Science In Documentary Under Threat?***

Even before the rise of 'reality TV' and the 'docussoap' there was mounting concern for the dramatized styles of documentary that had begun to emerge in the late 1970s and 1980s. On the 24<sup>th</sup> of April 1980 the Lord Privy Seal, Sir Ian Gilmore, sounded an alarm in the British House of Commons:

*The so-called dramatisation or fictionalisation of the alleged history is extremely dangerous and misleading and is something to which the broadcasting authorities must give close attention."* (Woodhead 2006).

Far from heeding Gilmore's warning however, the dramatized documentary became an increasing popular television format and over the following decades, the calls of 'misrepresentation', 'fraudulence' and 'dumbing down' science started to come thick and fast (Ellis 2005). The rise of reality TV and infotainment style programmes further undermined traditional factual and documentary television formats (Hill 2007), with much public and scholarly debate on the subject ensuing.

Over the last 10 years newspapers and online media in the U.K. have published headlines with claims such as; '*BBC abandons science*' (Orlowski, The Register 2006), '*TV dumbing down...*' (Midgley, The Telegraph, 2007), '*Fears over Factoids*' (Close, Physics World 2007), '*Fry attacks BBC's dumbed-down 'chicken nugget' television*' (Thomas, Mail Online 2010), '*Modern television is blighted by "ever-increasing vulgarity and ever-lower intellectual levels"*' (Furness, The Telegraph, 2013): the list goes on. The rot had apparently got so bad that in October 2012 the esteemed British science professor and medical doctor Lord Robert Winston was threatening to leave the BBC for a rival broadcaster. Winston accused the BBC, which has a long tradition of making high quality intellectual science documentaries, of dumbing down its science programming in the pursuit of viewing figures (Collins 2012).

The situation in the US is similar, with satirical news articles lambasting the lack of science on the 'Science Channel' being reposted by everyone from Pasco

Phronesis's David Bruggeman (2010), to the Richard Dawkins Foundation (2010).

The counter argument to this ever increasing dilution of science in documentary is that factual and science based programmes are now more popular than ever ("Ingenious" 2011). They are reaching previously unimagined audiences and there is another learning revolution taking place behind the scenes on the internet ("Ingenious" 2011). Nearly all of the television programmes now come with their own websites, providing information about programmes, further learning opportunities, science games and online discussion forums, that mean television is no longer a one-way medium.

The internet has also provided a platform for independent science documentary makers and communicators to promote and distribute their work, as well as, enabling audiences to seek out traditional high quality science documentaries and play on-demand or download for later viewing.

Calls of 'dumbing down' in science are not new. Charles Babbage published 'Reflections on the Decline of Science and some of its Causes' in 1830 (Hyman 1985) and it seems that nearly two centuries later the science establishment is still levelling similar accusations. The 1950s and 60s may have been a golden era for science documentary on U.K. and U.S. television broadcasters with the science establishment having a high degree on input and oversight (Boon 2008). However, there were still a large number of more entertainment based science programmes being made during this time (LaFollette 2002) and the origins of the science documentary were in fact more about entertainment than information.

### **3.4 Early Science Documentary**

The first recorded science documentary film was '*Cheese Mites*', made by Charles Urban and Francis Martin Duncan, which first screened at the Alhambra Music Hall in London in 1903 (Macfarlane 2010). The film depicted a gentleman lunching on bread and cheese while reading a newspaper through a magnifying

glass. When he casually turns his glass to look at the cheese the film cuts to a microscope-enlarged image of the cheese crawling with mites. Horrified the gentleman pushes away the cheese and flees his lunch.

The manager of the Alhambra Theatre had initially been sceptical of screening science films in his music-hall programme. However, August was traditionally the slackest month of year and so he took a punt on the idea (Pain 2008). The film was a sensation filling the Alhambra throughout its run and even prompted a spoof *The Unclean World* (which was released later that year). The film was also attributed with causing a boom in amateur microscopy and an alleged decline in cheese sales (Macfarlane 2010).

'*Cheese Mites*', made by combining micro-cinematographic technology (microscope and a cine camera) with a contrived storyline, marked the birth of the science documentary (Boon 2008). This film was more about novelty and entertainment than education, information and fact. It was the early days of cinema and the audience were looking for excitement and entertainment and they enjoyed seeing something rather revolting (Rohrer 2008).

The revolution of micro-cinematography was described by Béla Balázs (1972) as 'the first new world discovered by the film camera'. It was a world that revealed things previously unknown. These early science documentaries can be seen as part of the 'cinema of the attractions', which was associated with sensationalism and the presentation of the exotic, horrific, and the bizarre (Cowie 1999). The new technology had evoked new thrills and it had pushed the genre in a new direction.

The voice of these early science documentaries was more akin to the poetic mode of documentary than the expository and without narration or strong rhetoric these early microcinema films have been described as 'nothing short of microscopic theatre' (Stafford cited in Beattie 2008). It is especially true of the films made by the French filmmaker Jean Painlevé, whose underwater microcinema science documentaries have been described as being in the traditions of surrealist expression (Beattie 2008).

Jean Painlevé made scientific research films in the tradition of fellow Frenchman and pioneering science filmmaker and micro-cinematographer Jean Comandon. While Comandon did use his scientific films to popularise his research with other scientists, Painlevé managed to bridge the gap between films for the science establishment and for public entertainment (Beattie 2008). Painlevé's trick was simply to re-version his films, making one for the scientists, another for the universities, and a third shortened version, set to music, for the general public, in a style that would now be decried as 'dumbing down' (Hazéra & Leglu, cited in Beattie 2008). Painlevé's rationale for this was:

*'a film dealing with scientific subjects always risks being too sophisticated for one audience and too superficial for another. The scientist knows his subject matter and is protective of it... in contrast an ordinary moviegoer can't always rise to that level'* (Hazéra & Leglu, cited in Beattie 2008).

Painlevé was a serious scientist and a strong advocate for cinema in scientific investigation, but he also worked with avant-garde and surrealist contemporaries in Paris during the 1920s, 30s and 40s (Friel 2009). These cultural influences led Painlevé to mix avant-garde and documentary styles in his pursuit of popularising science (Beattie 2008). At times it seemed he had almost abandoned science especially with his now famous claim of 'science is fiction' and films that mixed comedy, surrealism, and poetry, to focus more on entertainment than science (Beattie 2008). However, Painlevé succeeded in turning the ordinary into the extraordinary and popularised science documentary during an era when the genre had abandoned its poetic beginnings and become dominated by serious expository mode films championed by Grierson (Beattie 2008).

### **3.5 The Question of Truth in Documentary Film**

The friction between science and documentary inevitably revolves around questions of 'truthful' or 'factual' representation of events or the evidence presented. Science is a discipline that seeks proofs, and relies as discussed above

on the use of unambiguous and clearly defined terms. Documentary on the other hand is by its very nature an interpretation of events which, as Bruzzi points out, inevitably falls short of authentically reproducing the actuality being filmed – ‘...documentary is circumscribed by its technical and theoretical limitations and can only present a mutable truth – the truth that comes into being as the documentary is being filmed’. (Bruzzi 2006 pg 132).

The issues of representation in film are not unique to documentary as Michael Crichton (1999<sup>1</sup>) stated in his address to the American Association for the Advancement of Science. ‘*The problems lie with the limitations of film as a visual storytelling medium*’. These are the same issues pointed out by theorists when dismissing the ‘truth’ claims of direct cinema. To tell a story in film, decisions have to be made: what to film, how to frame, where to cut, etc. Wildlife filmmakers often spend years capturing a sequence of events that is then edited together to make it look contiguous (Crichton 1999<sup>1</sup>). Time usually has to be compressed in film even when demonstrating simple scientific methods. The issue is not that filmmakers misunderstand science, but that science often misunderstands film (Crichton 1999<sup>2</sup>).

For these reasons documentary filmmakers have long since moved away from the fallacious objective ‘truth’ claims that were championed by the exponents of direct cinema and cinéma vérité. Errol Morris’s film *The Thin Blue Line* (1988) began a popular shift away from these attempts at objectivity and heralded a move towards the use of personal and subjective ‘truth’ claims by documentary filmmakers (Macdonald 1996). At the time of its release *The Thin Blue Line*, with its heavy stylised reconstructed scenes, was considered too ‘fictional’ for documentary and was marketed as ‘nonfiction’ film, which excluded it from Academy Award consideration (Morris 2008). Yet the film’s documentary status was readily accepted by film theorists and has gone on to be one of the more widely critiqued and discussed documentary films of its era (Nichols 2010, Bruzzi 2006).

The constructed nature of documentary film is now well understood by both filmmakers and audiences and many filmmakers deliberately draw attention to

this in an effort to persuade the audience of their honesty and integrity (Brooks 2010). Films such as Clio Barnard's *The Arbor* (2010) set out to deliberately expose how shaped and how similar the narrative structure of documentary is to that of fiction (Barnard, cited in Brooks 2010). Academy and Bafta Award winning documentary filmmaker, Kevin Macdonald, sees many similarities between documentary and journalism. Filmmakers deliberately cherry pick their footage and information sources to construct their films much as a reporter would do when writing an article (Macdonald and Cousins 1996). Macdonald now believes documentary has reached an age where 'anything goes' and the only obligation he sees as a filmmaker is to tell *his* version of the truth (Brooks 2010).

Applying this understanding to science documentary means that unless scientists are actually producing peer-reviewed films about their own work then, at best, science documentary must be considered as a form of science journalism and opinion and needs to be distanced from scientific inquiry and fact.

## **4 The Voice of the Audience**

Knowing and understanding your audience has been identified as one of the fundamental aspects of effective communication in numerous presentation and writing style guides. Knowing an audience's interests, likes and dislikes can help a speaker persuade, entertain and win them over (Kurtus 2005). However, to really bond with an audience, it is important to use language that fits that audience and matches your purpose (Kansas University Writing Centre Guide, 2013). Language that may offend or alienate one audience may help a speaker, or writer, bond and communicate with another. In other words you need to choose the right 'voice' for your audience.

These are the same principles of communication that were employed by Painlevé in the 1920s and 30s, when he re-versioned his science films for different audiences and popularised them for non-science audiences. It also is undoubtedly part of the rationale behind the 'dumbing down' of science in documentaries on modern television. Although this 'dumbing down' is clearly economically driven, with higher ratings and wider audience appeal part of the goal. These highly dramatized documentaries still provide a number of interesting communication and learning opportunities and are very likely reaching completely different audiences to the more traditional science documentaries.

### **4.1 Television audiences**

The commercialisation of television has created a highly competitive industry where attracting and keeping an audience have become the key drivers of programming (Archer 2013). This in turn has created a multi-billion dollar industry around understanding and measuring viewer numbers (ratings) and reactions of television audiences (Goldsmith *et al* 2011).

Through this model natural history and science documentaries have been developed and expanded, with producers and broadcasters constantly striving to

obtain higher ratings. While numerous traditional science and natural history documentaries such as *Africa* (BBC 2013), and *North America* (Discovery 2013), that attract large audiences,<sup>4</sup> are still being produced in the expository mode, with matter-of-fact and impartial sounding, voice-of-god narration, there is also now a huge number of more entertainment and performative style science documentaries being produced.

Documentary series such as *Animal Face Off* (Discovery 2004), *Jurassic Fight Club* (History Channel, 2008), *Deadliest Warrior* (Spike, 2009 -2011) and *Monster Bug Wars* (Science Channel, 2011 - 2012) take a completely different approach to science and natural history. The style of these documentaries, with their heavily dramatized narration, music and sound effects, is more in line with a boxing match or a World Wrestling Entertainment (WWE) programme, than the informative language and dulcet tones of Sir David Attenborough's narration. In fact all of these documentaries are based around real or hypothetical fights between various animals (including dinosaurs and insects), and human warriors (both ancient and modern).

*Animal Face Off*, for example, takes two top predators that could possibly (although unlikely) meet in the wild and simulates a computer-animated fight between them, with experts advising on the behaviour of both animals. Before the simulated fight takes place the animal opponents are presented in a hyped match-up like professional fighters, or specialised 'killing machines', with a detailed statistical breakdown of their size, weight, protective elements (skin/hide thickness etc.) and 'weaponry' (teeth, claws, venom, etc.), along with numerous fast-cut shots of the animal in action, killing and attacking. This is essentially what you would expect to see before watching a WWE, or other televised professional fight. This same formula is (more or less) used for all of the above-mentioned documentaries and many others. The style is part expository and part performative, however, the tone of voice and language used

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<sup>4</sup> The premiere of *North America* (May 19, 2013) was second highest rating cable programme, in the USA, for that Sunday (Bibel (Nielsen TV Ratings), 2013).

is dramatic and clearly aimed at an audience that is more interested in watching fighting than learning about animal behaviour or human history.

However, in the process of watching a simulated fight between a lion and a tiger the viewer is likely to learn a substantial amount about animal behaviour without necessarily being aware of it. When factual information is included, it is usually 'wow-factor' statistics, or information, chosen to impress audiences and delivered with hype, which makes it easy to remember. These programmes are made to be entertaining, not educational and they are not aimed at a science-literate audience. However, by focusing on the entertainment elements rather than the informative it means these documentaries can function as pathways to tangential learning, or self-motivated, natural learning.

## **4.2 *Tangential and Natural learning***

Winston Churchill (1952) once said, "Personally, I am always ready to learn although I do not always like being taught."

The concept of tangential learning through video games has been promoted by Floyd and Portnow (2008) as a method of enabling and facilitating learning without an education structure. The basic principle, outlined by Portnow (2008), is learning not by being taught, but rather by being exposed to things in a context in which you are already engaged. Portnow (2008) uses the film *300* (2006) as an example of how tangential learning might work, when a viewer, who enjoyed the film, might then undertake an internet search on the name 300 and end up at the Wikipedia page for the historical battle of Thermopylae and begin to read it. In this way the viewer has begun to self-educate in a manner of natural learning as outlined by Armstrong (1979).

The principles of natural learning that Armstrong (1979) identifies are what we used to learn basic skills such as, walking and talking. The most important aspect of this being that we were not actively taught these skills we learnt them through a four phase process that involves objectives, engagement, feedback and

application (Armstrong, 1979). A baby wanting a drink, for example, will quickly teach itself how to ask for it by applying these processes.

The principle of tangential learning builds on this idea of self-directed learning and combines it with the understanding that interest facilitates learning (Tobias, 1994). Both adults and children assimilate information better when learning about topics that interest them (Tobias, 1994) and therefore, programmes that aim to be entertaining are ideal platforms for audiences to learn from.

Applying these concepts to science communication in documentary film would suggest that viewers of a simulated fight programme, such as *Deadliest Warrior*, might, after viewing a battle between a Samurai and a Viking, then proceed to self-educate further on Samurais, Vikings or both and this does in fact appear to be the case. The internet is full of videos, blogs, and chat conversations where people are actively engaged in discussions about the outcome of this fight (and others from the same programme)<sup>5</sup>. The broadcaster itself also actively encouraged this debate by launching its own web-series *Deadliest Warrior-The Aftermath* (Spike.com, 2009) to provide commentary on specific episodes, as well as, provide its own chat forum where viewers could engage in discussions on the subject.

### **4.3 The Question of Integrity**

The argument that entertainment and profit driven documentaries can provide a pathway for science communication through tangential learning, is of course not only at odds with traditional science documentary, it also conflicts with the basic principles of scientific integrity. The integrity of science can only be maintained if it is allowed to be independent and uncompromised by influences such as, religious beliefs, ideologies, or commercial interests (Macrina,

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<sup>5</sup> <http://internet.youtube.com/watch?v=YkJPICRkWHE>  
<http://answers.yahoo.com/question/index?qid=20090414225507AAtnYK1>

2005). At a fundamental level, however, the same is also true for science communication. With the tangential learning approach based on self-motivated learning, the goal therefore is not to educate, or promote science, but to spark an interest so that the viewer will be motivated to find out more.

Essentially, it is unlikely that viewers who are interested in watching *WWE SmackDown!* (Syfy 2010-present) or *World's Scariest Explosions: Caught on Tape* (Brad Lachman, 1999) would be interested in watching a lecture on classical antiquity or geophysics. However, they might be tempted to watch documentaries such as *Deadliest Warrior* or *The World's Worst Natural Disasters* (National Geographic Channel, 2013) and afterwards be curious to find out more about the Spartans or plate tectonics. In this way these programmes can provide introductory pathways into science for non-science audiences. Therefore, rather than lambasting these documentaries for 'dumbing down' science, scientists could be working with producers and broadcasters to provide ideas for content and improve the learning links to other media platforms available to the curious viewer.

## 5 From Climate Science to Curling

### 5.1 *The Voice of Climate Change*

Documentaries about the threats from anthropogenic climate change, or global warming, began to emerge in the late 1980s and early 1990s. A growing consensus among climate scientists had alerted politicians to the seriousness of the issue and filmmakers and broadcasters began to produce documentary films with the aim of communicating the issues and the science to the public (Stewart 2009).

Alarmist documentaries foretelling the end of civilisation were not new, as Stewart points out in the 2009 BBC series *Earth: The Climate Wars*, wherein acid rain, desertification and a new ice age were all proposed as major threats during the 1960s and 70s. The early climate change documentaries, such as *Global Warming: Hot Times Ahead?* (1990), and *Global Warming* (1993), seemed to continue this trend and were expository mode films with didactic tones reminiscent of 1940s war propaganda films.

That a group of scientists had made incorrect predictions about the changes in the world's climate during the 1960s and 70s, with the media running stories about an 'impending climate apocalypse', has had a lasting impact on the climate change debate (Adler 2006). It has also fuelled the arguments of climate change sceptics who also started making polemic climate change documentaries in the early 1990s. These films, such as *The Greenhouse Conspiracy* (1990), which attempted to 'debunk' the science behind climate change predictions, also originally adopted heavily didactic tones and an expository mode of filmmaking.

Over the last 20-plus years numerous documentaries on climate change have continued to be produced, with their focus becoming wider and more varied. Broadly speaking these documentaries can be grouped under three main themes.

- 1) The impacts – both environmental and social – now and in the predicted future.

- 2) The science – proof (or disproof) of the facts, what are causes and why?
- 3) The solutions – what can be done to solve the problem?

With so much at stake (in terms of the environment, economies, and private wealth) there has continued to be much debate on the subject, with opinions remaining divided and a large number of 'sceptic' films have continued to be produced. These films nearly always focus on the science and attempt to discredit it and for the most part adopt the same 'trusted' voice of science and reason, common to respected science documentaries. Sceptic films, such as the *Great Global Warming Swindle* (2007), use a modulated authoritative 'voice-of-god' narration delivered by a professional male actor. Its arguments are supported by animated graphics and interviews with scientists, who talk with conviction, providing convincing rhetoric that looks and sounds similar to a flagship BBC science series such as *Horizon*.

In this way the sceptic documentaries have mimicked the voice of science, which is common to many of the films that are made in support of climate change science like the BBC Horizon documentary *Global Dimming* (2005). However, since the mid-2000s, climate change documentaries have tended more towards a presenter lead style. Films such as the BBC's, *Are We Changing Planet Earth?* (2006) and *Can We Save Planet Earth?* (2006) were both presented by Sir David Attenborough, giving them trusted name and voice, as well as a face. While these films are still classic, voice-of-authority, expository mode films, Attenborough does at times appeal to our emotions when attempting to convey the gravity of the situation. This trend was continued and taken a step further by Davis Guggenheim's Academy Award winning *An Inconvenient Truth* (2006), which was presented by former United States Vice President, Al Gore. In this film Gore not only presents the science, but also adds a personal and emotional spin to it, relating it back to his own experiences (Nielsen-Gammon 2007). While still essentially an expository film the emotional emphasis Gore brings adds an element of the participatory mode, giving the film a more emotive voice, almost a pleading. The film takes us on a journey of discovery with Gore exploring the science and predictions as well as his own life story to show us he is real and

genuine, giving the film both expository and participatory truth claims. These emotional elements were also the focus of much of the criticism of the film, with Nielsen-Gammon (2007) accusing Gore of substituting a scientifically valid argument for an emotionally powerful one.

However, although the science community found *An Inconvenient Truth* lacking in a number of areas, the film itself was a huge commercial success and is still the ninth highest grossing documentary of all time (“Documentary Movies” 2010) and the highest grossing documentary directly tackling the issue of climate change. The success of this film spawned a number of equally emotionally charged sceptic films, the first of which was Steven Hayward’s *An Inconvenient Truth...Or Convenient Fiction?* (2007). This film was a lower budget version of Al Gore’s film and essentially attempted to reconcile some of the inconsistencies Hayward saw in Gore’s film (Hannafor 2007), using both expository and participatory modes that gave Hayward’s voice a feeling of honesty.

*Not Evil Just Wrong* (2009) took emotional arguments even further, by trying to suggest that the impact of climate change legislation in both in America and developing countries around the world, would hurt the working poor and cause loss of livelihoods and even life. This film, as with most of the other films that have been made in reaction to *An Inconvenient Truth*, is essentially just political propaganda, with little to do with the science and more about attacking the politics and Al Gore’s character. The latest of these films, *An Inconsistent Truth* (2012), is a performative documentary, presented and narrated by talk radio host Phil Valentine. This film uses comedy antics and performance from Valentine to subjectively attack Al Gore and create conspiracy around the climate change science.

Over the last decade the trend towards more emotive participatory and reflexive documentaries on climate change has continued, with filmmakers seeking to connect and engage their audiences on a personal level. The film *Chasing Ice* (2012), follows the work of environmental photographer James Balog, as he travels to the Arctic in order to capture time-lapse film of glacial

retreat. This film is about Balog's own personal journey of discovery, not the science. Balog's time-lapses produce images of rapid glacial retreat taking place in Greenland and Alaska, but the message of film comes from his reflective dialogues about the impact the events he has witnessed are having on him. He also talks about the moral dilemma he faces when thinking about the future of the planet, drawing the argument away from science and more into emotion.

The use of emotive arguments in climate change films was taken even further by films such as *Sun Come Up* (2010) and *The Island President* (2011), which both document the threat of cultural loss from low lying islands that are being lost as sea levels rise.

In *The Island President* Jon Shenks follows Maldives' President Mohamed Nasheed as he campaigns for political action on climate change, at the 2009 Climate Summit in Copenhagen. Nasheed's tone and voice makes him sound almost on the verge of tears every time he speaks and the subject matter, which is the literal survival of his very low lying country and everyone in it, completes his emotional argument. This film uses an observational mode of filmmaking, when following Nasheed's campaigning at the summit, to give the film a voice of 'objective truth' in a direct cinema style, that also works to convey a sense of urgency, as if everything is unfolding in real time.

Therefore, the voices that are emerging from these observational, participatory and sometimes even performative films, are now more aligned with emotion and ethos, than science. The expository mode voice-of-authority is still a popular style for explaining the science and ideas in these films. However the presenter's ethos or 'character' is just as important as the information they are delivering. This shows that climate change documentaries have now become fully grounded in the realm of rhetoric, with personal and subjective 'truths' dominating debate.

## **5.2 *Gone Curling – Pathway to Production***

During the preproduction phase of our MSciComm film *Gone Curling*, Rachael Patching (my filmmaking partner) and I drew up a set of objectives that we would like to achieve with the film. One of these was to make a film with a subtler message than is commonly found in many environmental and climate change documentaries. Furthermore, I was interested in exploring the concept and methods of reaching new audiences with science and environmental filmmaking.

Climate change has been identified as a major threat to New Zealand's economy and in particular the primary industry sector (Gluckman 2013). Yet recent studies in New Zealand (NZ) have shown that only around 50% of farmers believe that the climate is changing and only about 40% believed that climate change is being caused by humans (Niles *et al* 2013). This is a sector whose output and growth is currently heavily reliant on agents known to cause climate change (i.e. fossil fuels) and therefore has a large vested interest in the issue and in government policies that might seek to address it.

Research into change resistance has shown that the problem is institutionally systemic and that even in the face of collapse, ecologically destructive and inequitable systems can be highly resilient and resistant to change (Markvart 2009) [e.g., Berkes & Folke, 2002; Allison & Hobbs, 2004; Brown, 2005; Runnalls, 2008; Finley, 2009; Walker et al., 2009]]. Based on my own experience and observations of environmental campaigns, I had also seen that tackling issues head on can often deepen divides and further polarise opinion. This has often been shown to be the case with climate change where, despite increases in good science based communication on the issue, public opinion had become more polarised, not less (Hart & Nisbet 2012).

Therefore, despite the large and diverse range of climate change documentaries that have already been produced most are only likely to attract audiences already interested in the subject. Furthermore, with a large number of climate change documentaries being made by sceptics, with a vested interest in subversion of the facts, it is likely audiences with a preconceived aversion to

climate change science will watch films that are in agreement with their beliefs. This means that on both sides of the debate a large proportion of these documentaries are only watched by those who have either already accepted climate change as a pressing issue for society, or those who have rejected it, and thus are 'preaching to the converted'. While there is nothing inherently wrong with this and can be seen as a healthy form of idea sharing and argument testing, it does not necessarily promote the issue to a wider audience. If people have no interest in the subject, or have chosen to be wilfully ignorant of it, they are unlikely to watch any film on climate change.

### **5.3 Outdoor Curling**

Making a film about outdoor, natural ice curling in central Otago was chosen as it provided an ideal platform to reframe the climate change issues and present it to a community (NZ agricultural producers) that have generally shown resistance to accepting (or lack the knowledge of) the science around climate change (Niles *et al* 2013).

Outdoor curling, or crampit curling, was introduced to New Zealand in the early 1860s by people from Scotland who came to Otago in search of gold (Inder 1978). The harsh winters allowed the game to thrive in Central Otago and because of its isolation from the rest of the curling world, the traditions of the game remained relatively unchanged, for more than 100 years (Mawhinney 2002).

The traditional game differs from the modern game in a number ways that make it unsuitable for playing on an indoor ice surface. Until the construction of artificially assisted outdoor rinks in the area, first in Naseby in 1989 and then in nearby Alexandra in 1992, curling matches could only be played when climatic conditions were favourable for producing thick sheets of ice on local ponds and lakes. Many of the more traditional competitions and larger games are still only played on natural ice. This has meant that in recent years grand matches (regional or nationwide games) such as the national bonspiel, the Baxter and

Wilson cups, have only been played very infrequently (Mawhinney 2002; “Idaburn Council” 2013). The New Zealand bonspiel has been held just 10 times in the last 40 years, despite having been played at least every second year for the previous 92 years (“The Bonspiel” 2013). The pattern is similar for both the Baxter and Wilson cups as well, with a lack of consistent ice since the mid-seventies greatly reducing the frequency with which these games are held (Mawhinney 2002; “The Bonspiel” 2013).

#### **5.4 *Gone Curling Film Production***

Our goal in making *Gone Curling* was foremost to produce a film about the uniqueness of natural ice curling in Central Otago. This was done to attract an audience that was not necessarily familiar with climate change and climate change documentaries. By focusing on one of the grand matches (initially the NZ bonspiel was chosen but was changed to the Baxter Cup because of filming logistics), we were able to show some of the risks that climate change posed to outdoor curling in New Zealand and frame the climate change issue in a new way. Knowing that the farming and agricultural communities of Central Otago were passionate about outdoor curling and about keeping the traditions of the game alive we were able to make a film that they would be keen to watch and would subtly communicate the reality of climate change to them on a tangible level.

Our goal was not only to communicate the threat of climate change to a possible new audience and one that had been shown to be ignorant or sceptical of climate change science (Niles *et al* 2013), but to do so in an entertaining way that might inspire the audience to find out more about the subject afterwards. In this way we hoped the film would also stimulate conversation on the issue afterwards and facilitate pathways to for the audience to learn more on the subject.

## **5.5 *The voice of Gone Curling***

While weaving a climate change story in a documentary on outdoor curling might help attract a new audience to the subject it did not guarantee the audience would listen to the message. Or as the proverbial wisdom tells us '*you can lead a horse to water, but you cannot make it drink*'. Therefore, it was important that we chose the right voice for the documentary, which in this case meant it had to be the voice of the locals and the voice of Otago. It was decided that the best way to achieve this would be through a participatory style of filming where we immersed ourselves in the community and culture and helped out organising and taking part in events. As we were not locals, however, we did not want to add another voice to the film by actually including ourselves, or any self-reflective elements. We also wanted to explore some elements of creative treatment (part of Rachael's thesis) and so we included some performative elements as well.

The participatory style filming and causal interviewing and questioning of our characters allowed them and the other locals to become very comfortable with us, and the camera. So over time they began to trust us more and talk freely to one another and act naturally in front of the camera. We were then fortunate that it was another warm winter and we were able to capture their genuine disappointment at the lack of ice, as well as moments of astonishment at the unseasonal warm weather.

To tie the story elements together and compress time (and meet our delivery specification), voice-over narration was needed. Again it was important for us to select a narrator with a rich Otago toned voice that was in keeping with the other voices of the film. We wanted this to be a film that felt like it came from them and spoke about *them* to *themselves*.

For this reason the performative elements we included in the film helped as well. These elements, which included a synchronised indoor curling montage (that was used to contrast the modern game with the traditional one) and a moody bagpipe performance in the early morning mist, were used to create space in the film and hopefully allow the audience a chance for self-reflection.

This could mean that for its primary communication purpose the film might have limited audience appeal, as both the curling community in New Zealand and the farming community in Central Otago are small (the population of Central Otago is just 16,647 (Statistics New Zealand (2006)). By making a documentary that was first and foremost about curling and aiming for it to be entertaining first and informative second, opened the film up to a wider audience. World-wide there are millions of curlers (Canada alone has 1.3 million curlers (Wieting and Lamoureux 2001)), who might be interested in watching the film and be inspired to learn more about outdoor curling or climate change. However, the greater goal was to show that with certain audiences, science communication could be more effective when it was approached indirectly.

## ***5.6 Distribution and Reception of Gone Curling***

Promoting and distributing films is one of the biggest obstacles faced by independent filmmakers. The main target audience for this film was the local curling and farming community of Central Otago. However, as a result of the approach we had taken with the film we were able to access a number of other niche audiences quite easily including the wider curling community (both in New Zealand and overseas), winter sports enthusiasts, Scottish heritage societies, as well as environmental and science communication audiences.

Overall the reception of the film in Central Otago was very positive. The local community in this area is tight-knit and we were able to promote the screenings easily by word of mouth. We held a screening Naseby, where the film was set, shortly after the film was completed, which was also accompanied by a question and answerer (Q&A) session. The Q&A session was illuminating and gave the local community, many of whom had helped with the making of the film, a chance to give us feedback. While the climate change angle did not come as a complete surprise to many of them, as they had been subjected to numerous questions (gently) probing this topic, there was some disdain expressed by a couple of the farmers regarding the films inferences that a warming climate

would spell the end for outdoor curling in the area. However, they were outnumbered by those who seemed to accept that we had not manipulated the facts and that a warming climate posed a real threat to the survival of the sport. I also felt that because we had made a real effort to celebrate a sport that they were so passionate about, there was a real openness towards accepting the film's other storyline, that climate change would spell the end for outdoor curling.

Accessing the wider farming community outside of Central Otago has proven more difficult. Although, both Television New Zealand (TVNZ), and TV3 were approached and expressed some interest in the film, so far neither of the two main broadcasters has screened it. In an effort to get the film seen, a small tour of rural South Island towns was planned for 2012, with *Gone Curling* to screen in conjunction with *Plough!*, a film by fellow student Michael Henríquez about the 57th World Ploughing Championships that were held in Methven (Mid-Canterbury) in 2010. The agricultural focus of *Plough!*, was seen as a good way to draw more of a farming based audience and a number of the towns such as, Methven, Timaru, Ashburton and Tekapo also had active curling clubs. The tour was cancelled unfortunately because of time and financial constraints but there is still a plan to undertake a similar tour at some point in the future.

The curling community around the world has also expressed some interest in film, with a number of screening requests from curling clubs in Canada, America and the United Kingdom. To date, we have also sold and distributed over 200 DVDs to curling clubs and enthusiasts in these countries.

We also promoted the film through a variety of different film festivals in North America and Europe including mountain sports, wildlife and environmental, as well as, arts and culture film festivals. From these festivals the film was nominated for a prestigious Panda Award at WildScreen film festival in Bristol (UK), for its 'fresh take on environmental filmmaking', as well as, receiving a special mention at the Banff Mountain film festival for its 'unique cultural aspects'. The film's success at these festivals led to us selling the distribution and television rights to the Scottish based company Journeyman, as

well as, been invited to join the Banff world tour which took the film to more than 50 countries.

In New Zealand the film was also screened at the Documentary Edge festival (Auckland 2011), and the Reel Earth film festival (Palmerston North 2012), where it won awards for best documentary and best immersing talent, receiving radio and press coverage of its success at both festivals.

Among the other screenings of the film in New Zealand, it has been shown at the New Zealand Winter Games Adventure Film Festival (Queenstown 2013), a Green Party fundraiser (Auckland 2012), and broadcast on SKY Channel 83 (FACE TV) (August 2012). In 2013 we were also approached by the Waipu Caledonian Society to screen the film as part of the district's annual celebration of their Scottish heritage (screening to take place in 2014).

Although it is impossible to assess the impact of the film on these audiences without surveying them, given the wide variety of festivals and events that the film has been screened at, we can assume that, at the very least the film appeals to more than just a climate change or environmental film audience. Gauging the reach and impact (if any) that film has had on attitudes towards climate change within audiences from the New Zealand framing community would require further research and surveying. However, given that our approach was to produce a film with a subtle and non-didactic message that could facilitate self-learning and education on the issues of climate change, producing any categorical assessment of the film's impacts would be extremely difficult and could even undermine our approach altogether.

## 6 Conclusion

The changes brought to science documentary by the commercialisation of television have been heavily criticised by the science community for undermining the traditional knowledge and information goals of the format. It has brought the voice of entertainment and drama to a genre that was traditionally defined by the 'voice of authority' and 'truth'. However, traditional expository mode science documentaries are still being produced and are still attracting huge audiences, suggesting that dramatized and entertainment based science documentaries are drawing new audiences to the genre.

The internet has made television into an interactive medium, with numerous online discussions taking place around programmes, as well as broadcasters providing their own online platforms to encourage discussion and further interest. This has introduced new learning opportunities and documentaries designed to entertain can also provide pathways for tangential, or self-motivated learning. By presenting science in a non-educational format it can reach new audiences. It would seem well worthwhile for scientists and science institutions to encourage learning links to all levels of television programming.

The impending dangers facing our civilisation from anthropogenic climate change have been subjected to intense media debate, with numerous well-funded documentaries claiming conspiracies around the issue. These documentaries have used the traditional voice of science against itself, as well as using modern entertainment and performative modes of voice to make light of the issue. However, advocates of climate change science have been largely focused on the traditional expository mode voice of science, or on the ethnographic and personal voices of the participatory and reflexive modes. While these are important and compelling voices in this debate they may not be the most influential. By examining what audiences these documentaries are not reaching, and attempting to understand why, it may be possible to identify and target new, or pivotal audiences in this debate and communicate to them in a language and voice that they are responsive to.

This is not to suggest that both traditional and current science communication in documentary are not effective, merely that it should not be looked at from a 'one size fits all' approach and what one audience finds abhorrent, another might find inspiring. Nor is it to suggest that any subversive tactics should be employed in science communication, the objective when promoting tangential learning is to make the audience curious enough to find out more. The argument presented here is that in some cases science communication in documentary film could be more effective when approached from an audience first and information second perspective. This means that a subtle or indirect approach is more effective with some audiences, while a direct and didactic approach will work better with others.

Thus the voices of the poetic and performative modes could be just as effective at communicating science in documentary as the traditional, and more direct, voices of the participatory and expository modes. Further investigation of the links between voice and audience is recommended, to advance our understanding of how different voices can be used to communicate with selected, or target audiences.

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