



Musical Modelling: The Charismatic Teacher and Learning through Music in Television Documentary

Geologist Iain Stewart is the most recent inheritor of a television tradition of the charismatic teacher who takes viewers on a “personal journey” through a documentary series. Taking the talking head out of the studio and into the museum (*Civilisation: A Personal View* by Kenneth Clark, 1969), historical sites (*The Ascent of Man*, 1973, with Jacob Bronowski), and even a virtual Library of Alexandria (*Cosmos: A Personal Voyage*, 1980, with Carl Sagan) gives a television program movement and energy. However, the persistence of direct address maintains a classroom dynamic. These series all, directly or indirectly, stem from the tenure of David Attenborough as controller of BBC2. Attenborough is best known as the nature documentarian whose hushed, urgent cadences give a “you are there” perspective, as if he were whispering information into the viewer’s ear. Both of these models transmit authority, but differ in the relationship between the audience (students), teacher, the subject at hand, and any analytical object that the teacher may use to enter that field. Attenborough’s narrating convention suggests distance between the audience/teacher in the “duck blind” and the subject/object in the field; the personal journey model places the distance between the audience and the teacher/subject/object — the teacher is a performer on a stage, drawing in the audience in a manner that replicates the distance as configured in a typical classroom, with the added cinematic advantages of editing, graphics, and especially music.

One of Attenborough’s strengths as a programmer is formal flexibility. While his own series were marked by his naturalist’s eye, effacing his own presence onscreen (though arguably intensifying his vocal signature), the series that he developed established the “personal journey.” The format centres on a figure we might term the “charismatic teacher” — someone who not only imparts information from a position of authority, but does so in an opinionated and idiosyncratic manner. The extensive use of music in all these series is part of the luxurious presentation that signal them as prestigious productions; it can become part of the on-screen persona of the charismatic teacher, an extension of personal voice. The extent to which music interacts with presentation varies as much as individual styles do, whether

(mostly) historically accurate in *Civilisation* or in the eclectic, polysemic scores of *The Ascent of Man* and *Cosmos*.¹ The music in Attenborough’s documentaries, by contrast, tends toward two extremes: the anthropomorphism of the charismatic fauna in front of the lens, and the spectacularization of landscape, especially in such recent, high-definition explorations as *Planet Earth* (2006) and *Life* (2009).

Stewart seems poised to succeed Attenborough as the BBC’s premier documentarian. He has fronted eleven documentary series since 2004, plus several editions of the BBC’s *Horizon* science series, and, as a former child actor, has a particular ease relating to the camera.² Although the series vary in stylistic approach, each focuses on Stewart’s enthusiasm and energy. He is an unusually kinetic figure: hiking, snorkelling, tree and rock climbing, travelling in small exploratory helicopters or submarines, and occasionally performing truly idiotic — I mean, dangerous — stunts, like descending into a glacial crevasse or setting methane pools alight in the defrosting Siberian tundra.

Stewart’s active, engaging persona, prone to excited utterances in an animated Glaswegian accent, tends to close the gaps in the address, particularly in moments that focus on the emotive aspects of learning: awe, discovery, and understanding. Music is a strong factor in bonding the audience/host/subject/object in those moments. The music models a response from the audience more overtly than in previous documentaries of this stripe, moving beyond mere illustrative function in ways that should aid comprehension

1. I will be discussing these documentaries in more detail in a forthcoming study of genre and modes of representation in television, provisionally entitled *A Window on Convergence*.

2. Stewart’s contemporary, the astronomer Brian Cox, is not quite as prolific and has a different mien. Cox’s documentaries are similarly constructed, but Cox is a more diffident, airy presence and the music is canted much more toward explanation and awe and less toward problem-solving — he’s a “tell” teacher, whereas Stewart is a “show” teacher. Their disciplines have an unavoidable influence; for instance, Cox is often at remote locations to look at the sky, whereas Stewart is there to interact with the location itself. When Cox is in the desert, it is to use the sand as a demonstration of entropy; when Stewart is, it is for the chemical composition of the sand.

and learning. In some instances, music actively manipulates the audience by eschewing historical accuracy to make points immediately legible to an audience through its ability to evoke affect (power, reverence, hedonism). In other cases, Stewart's moments of doubt or fear are underscored in ways that may undercut his authority with the audience but increase their empathy and therefore their receptiveness. In the most recent series, a dynamic melding of manipulated image, graphics, and music mimics the exciting rush of information assimilation, ordering, and comprehension that comes with understanding. This encourages not just learning in the immediate moment, but fosters continued desire for learning by shaping the experience as enjoyable, even exhilarating.

Legibility

Stewart's documentaries, to varying degrees, still use music in familiar ways — theme/logo music, various kinds of illustrative and connotative music (such as pounding surf-punk for a sequence about air surfing to demonstrate the atmosphere's fluid properties), and certainly music for spectacle. While other presenters may evoke awe by implicitly saying "Look at that!", Stewart implies, "Look at this!", such as when he walks, turning and gazing, into the Wave, a location in the Arizona desert where the sandstone has been worn into the shapes of flowing water by the wind. Although his responses appear genuine, he is also modeling desired responses in the audience, and music based on the referential language developed in theatre and film often literally underscores those moments — both highlighting and lying beneath, apparently redundant but also guiding the perception of emotive content.³

Sometimes that response is better elicited by music that foregoes historical and/or cultural accuracy for a more transparent and easily grasped meaning for the, mostly British, audience. A relatively simple example comes in episode four of *Hot Rocks* ("Belief") when Stewart, at the Vatican, describes the religious context of late pagan Rome and the largely secret operation of Christianity. The historical disjunction between the location and the subject is obvious; however, the use of Handel's English coronation anthem "Zadok the Priest" is not. The anthem — even its homophonic, dactylic march rhythms read as Protestant — clashes with both the Catholic Vatican and the late-ancient marginalization of Christianity. On the other hand, the strong opening rhythm evokes imperial authority, matched to looming images of papal statuary and the colonnade that may read as more "Roman" than "Christian" in such short

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shots. In this instance, being historically accurate would not so clearly shape the point of institutional power overwhelming the Christian minority.

Similar crosscurrents are attenuated in the next example because of the presumed unfamiliarity of the primary audience with the religion being discussed. In "Indonesia" from *Journeys into the Ring of Fire*, Stewart explains the relationship between ancient animism, Balinese Hinduism, volcanoes, and tourism. The preparations for a significant ritual are accompanied by music that has the restrained, deliberate traits of an Anglican anthem. Even as we move to a procession of Balinese dancers, the editing fits their movements to the hymnic music. This can foster a kind of seamless meaning for those who know nothing about Balinese music and tradition, investing the ritual with the appropriate solemnity from a more familiar source; however, for the probably quite small fraction of the audience familiar with the tradition, the effect is jarring. Both readings are disrupted by a cut-in of Stewart and a Hindu priest speaking at the ritual: the sound was obviously captured at the event, and for a moment, we hear a burst of the loud, fast gamelan music of the ritual, over which they have to shout to be heard.

In an arguably more successful example, also from the "Belief" episode, Stewart takes us to the Milvian Bridge and the story of Constantine's conversion to Christianity. Quick editing intercuts shadows of spear-armed men on horseback cast onto stone-bricked road with Stewart walking and talking in a circle around the camera on the bridge. The sound of clashing swords, horses, armor and shouting together with pounding drums create the impression of battle without straining the budget.

Then we meet Stewart again in the Italian countryside near the Sirente crater lake, in idyllic musical silence as he explains the theory that Constantine's vision of the cross in the sky was the mushroom cloud from a meteorite impact. A local legend describes such an impact during a harvest festival dedicated to the goddess Cybele, amid wine and lascivious dancing. Rather than re-enact this, a sequence of fast editing intercuts vertiginous camera swoops and moving shots of Grecian urns to the driving rhythms of electronic dance music: wildly inaccurate historically, but an effective allusion more kinetic than cultural, as the painted nymphs and satyrs, echoing Stewart's narration, appear to gyrate to the music.

3. Sound theorist Michel Chion calls this effect "added value," where audiences perceive music as merely replicating information that seems self-evident on screen, but in fact the information is either partly or entirely transmitted through the music (5).

Anxiety and Awe

Earth: Power of the Planet (2007) has a noticeable increase in budget from the earlier series and displays the same high definition technology and advanced computer graphics as *Planet Earth*.⁴ This also means travel and adventure for the host, ranging well beyond the Mediterranean scope of *Journeys from the Centre of the Earth* or the focused locations of *Journeys into the Ring of Fire*. Stewart's willingness to do dangerous feats in order to experience geology first-hand is part of his authority. Of course, climbing the face of a frozen waterfall or abseiling into the crater of an active volcano makes for great television (arguably edging the genre toward reality television or extreme sports coverage). It also brings the audience to the coalface of geology, as it were; Stewart can show the transformation of snowpack and ice into a glacier, or use a roiling lava lake to explain the principles of plate tectonics as local convection causes rifting and subduction in miniature. It is research-led teaching in action, demonstrating both what happens and how scientists observe and understand.⁵ Conversely, his moments of doubt and anxiety, while possibly undermining this authority, can heighten the empathetic response — most audience members would understand these moments of hesitation and find them reassuringly human.⁶ Often these moments are themselves musically silent, but framed/primed by anxious music beforehand and awestruck music as Stewart reaches his goal.

One of the richest, and most representative, of these sequences occurs in "Rare Earth," entailing the exploration of a cenote in the Yucatan. These flooded sinkholes are a result of deformation of the limestone by the Chicxulub meteor strike that may have caused the extinction of the dinosaurs. A flyover of the jungle is accompanied by the low, surging strings often associated in the series (and, indeed, many cinematic representations as well as other BBC prestige documentaries) with the deep ocean.⁷ A higher drone

adds a note of tension as we drop down to the team hacking through the underbrush with machetes, accompanied by insets of a crocodile, a jaguar, and a very large spider to amplify the sense of danger amidst the exoticism provided by monkeys and small rodents.

Sitting on the rim of a cenote, Stewart explains the geological feature, then peers over the edge, commenting as with a combination of awe, humour, and apprehension, "It's quite deep, isn't it?". The cave-diving team leader, Bernadette Carrion van Rijn, replies calmly, "It's actually *very* deep," and the music re-enters with a nervous rhythmic pulse as the team rigs up for the descent.

In the first shot from inside the cenote, a narrow shaft of sunlight follows van Rijn down a simple ladder into a rocky void. The frame cuts off both the top and bottom of the ladder, and most of the frame is dark around the climber, fostering a sense of expansive space and human isolation, despite the obvious fact that there's a camera team down there. A solo female vocalise⁸ accompanies van Rijn. The melodic profile features leaps upward of a fourth or more that fall to comforting modal resting places; this surging, rising line and archaic melodic structure evoke a quasi-liturgical awe.^{9, 10}



As she reaches the foot of the ladder and calls up, "Okay, I'm down," light floods the cathedral-like space and the vocalise is joined by the orchestra in a sanctifying plagal ("Amen") cadence. This is almost immediately recontextualized, however, as a half-cadence in another key, opening

4. In his first series, Stewart used groups of schoolchildren in a Roman plaza to demonstrate the movement of magma in the earth's mantle, or water polo players with beach balls to act out the erosion of salt into the sea. These "audience participation" techniques are much cheaper than state-of-the-art graphics, and may be just as effective at engaging learning, whether directly or vicariously through the television; however, they are not as "spectacular".

5. Stewart occasionally mentions his wife's admonitions not to "geologize" on family excursions, briefly piercing the veils between "research" and "personal life" on the one hand and "teacher" and "person" on the other. The osmosis between these conceptually distinct arenas is familiar to anyone who studies something that surrounds us on a daily basis, whether geology or media.

6. Many of these hesitations are cut out of the American versions. While this might simply be for time (such as the time-travelling animations that were cut from *Hot Rocks*), the consistency with which his expressions of nervousness are cut is suggestive of a discomfort with potential degradation of authority.

7. This musical trope dates back at least to Mendelssohn's "Fingal's Cave Overture".

8. A vocalise (pronounced vocal-ese) is a piece of music sung wordlessly.

9. The melody is roughly in E minor with a raised 4th scale degree, which features a stereotypically "exotic" augmented second.

10. Beauty shots of the seething lava lake at Erte Alé ("Volcano") are also accompanied by a different female vocalise, one with Orientalist microtonal ornamentation and pulsating compression vibrato. That vocalise, however, is mixed down almost to the point of inaudibility. The near-subliminal exoticist touch is multivalent: for location (Ethiopia is a long-standing site of the undifferentiated "other"), for danger/fear, but also for seductive allure.

the musical cue up for a vast extension, much like the space the light reveals.¹¹

Stewart climbs down into the beautifully lit cavern and pauses on the ladder to look around and gasp, “Wow!”



The vocalise leaps up to a high dominant, the melodic peak, and falls back on a half-cadence through a descending minor tetrachord, bringing both equilibrium and potential energy.¹²



The music fades as Stewart and van Rijn discuss the cenote water system, and the nervously rhythmic music returns as they bring all their gear down and Stewart imparts geological information and outlines the dangers of cave-diving. Then the music stops again. Suited up for diving in the pool at the base of the cenote, Stewart looks visibly shaken and admits, “I’m not sure if I’m ready for this.” He laughs nervously, “I’ve got all the equipment. But — ah — there’s something about going down into the water when you’re not quite sure where your exit is...” His tempo and volume trail off as he looks back into the distance. Then he says assertively (as if to reassure the audience and perhaps himself), “But I trust Bernadette completely here. She knows

what she’s doing.” Another nervous laugh. “So I’m as ready as I’ll ever be.”

They descend into the clear pool with a delicate lace of medium-to-high pitched drones entering and fading in the musical texture. They sound almost like bells, or a musical approximation of water droplets. Blending the typical illustrative function of documentary music with a tentative texture, this is not the lush, awe-invoking surge of orchestra one might expect right away. Instead, the music mimics an attraction to the beauty and a hesitance about what lies beneath.

The Rush of Understanding

Stewart’s most recent series *Rise of the Continents* (2013) contains sequences that blend legibility and empathy to reflect/mimic the rush of information, insight, and excitement that comes from gathering, processing, and understanding. Quick edits and time-phased images are illustrated with graphic “chalkboard” imagery of chemical equations, diagrams, and charts. Similarly, fragments of Stewart’s narration, reflecting forward and backward in the episode, are impressionistically edited to whooshing sounds and minimalist music.

This complex of representation — complex is both a descriptor and a noun here — is a development of the affective informational bursts in Stewart’s *Earth: The Climate Wars* (2008).¹³ In that series, the information is not always directly relevant or even legible, but adds context and even emotive punch: print from a report flashes by too quickly for comprehension, but the volume of information is conveyed; test footage of a Nike Zeus missile is not directly relevant to a discussion of a climate report, but underlines the researchers’ ties to the US government and the defence industry.¹⁴

11. Cadences are like punctuation; a full cadence is closed like a full stop/period, a half-cadence is open like a comma or semi-colon. A closed, plagal cadence on one tonic (final or “home” pitch) can re-read as an open, authentic half-cadence on another tonic, depending upon the syntax around those particular melodic formulations and chordal structures. The modulation (a shift made by such a syntactical recontextualization) to a third-related key also has a long history of association with both magic and transcendence.

12. A descending minor tetrachord has been characteristic of a lament since at least the 18th century; it outlines a half-cadence, but is typically repeated to form a closed loop.

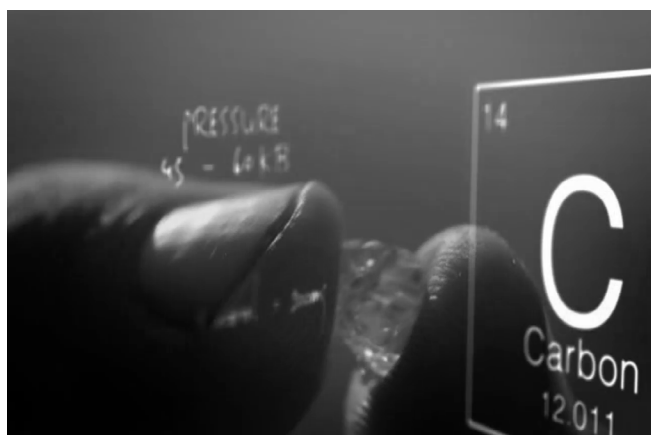
13. For extended discussion, see Stilwell (2013).

14. Another precursor, if not direct influence, comes from the television series *Numb3rs* (2005–10). This procedural centred on a mathematical genius, Charlie, who assisted his FBI-agent brother in cases with his ability to detect patterns. Two different types of special sequences feature in the series: “CharlieVision,” in which Charlie processes information and forms models; and “AudienceVision,” in which Charlie explains his insight to both the diegetic and non-diegetic audiences, usually using an extended metaphor, such as comparing a forgery to the way one runner trying to follow in another runner’s footsteps on a beach will necessarily blur the original footsteps as the second step degrades the footprint in the sand. Both types of sequences use fast editing, altered playback

The “understanding” sequences in *Rise of the Continents* start with a burst of information, as if laying out the tools the audience will need and supplying them with a burst of the excitement a good teacher demonstrates for students. What had been projected only by Stewart’s energetic presence in earlier documentaries has now become an externalized model of the teaching/learning process.

In “Africa,” a trip to a diamond mine in Sierra Leone illustrates the distinctive qualities of the five ancient cratons that underlie the continent and generate diamonds. Standing on the edge of the mine pit, Stewart holds a tiny rough diamond to the light between his thumb and forefinger. An inserted wide shot of the mine is covered with hexagonal light flare, as if we are looking through the diamond.

The image is superimposed over itself in jumpy phases as we hear similar superimposition of fragments of Stewart’s future narration; certain words (“carbon”, “pressure”) stand out in relief as the carbon unit from the periodic table, chemical symbols, and a floating molecular model of a diamond turning before Stewart’s eye fades in and out.

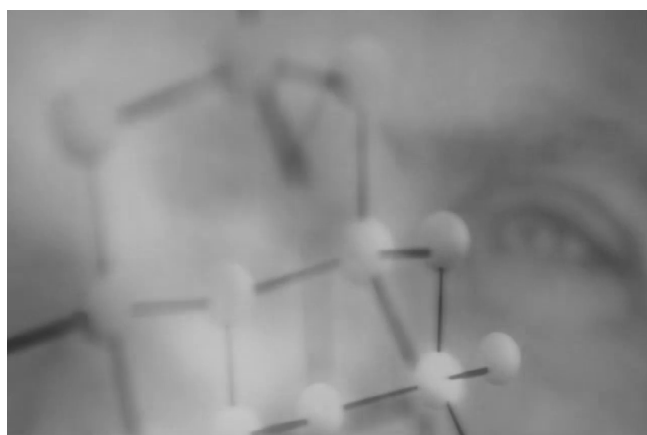


We fall into a 3D image of a craton and a whooshing sound zooms us out to a model of the moving continents of the ancient Earth before we re-emerge to Stewart for an extended explanation. In this “lesson,” we engage in longer interactions with the models and diagrams, and the narration includes the full context of the fragments from that initial burst of affective information. The initial, overlapping, quick-cut sequence is scored with a repeated, rising consecutive four-note sequence that has long been associated with counting and time passing, and as we merge back into “real time,” the score shifts into a slowly rising sequence, giving the impression of slowing down into “real

speeds and coloration, and the drawing of information onto the screen as if onto a virtual chalkboard; they are accompanied by minimalist, techno-style music and swooshes and booms that make the onscreen graphic manipulations seem as if they are taking place in real space, with weight and atmospheric resistance and surface contact.

time” as well as playing on associations of grandeur and awe that run throughout BBC documentary musical styles.

The modern documentary — particularly the prestige television documentary exemplified by Attenborough’s BBC tradition — operates in a space not between entertaining and informing, but in one that overlaps both. Historically, spectacle, especially the pushing of the technological envelope, has been a key element in engaging the audience: *Civilisation* was occasioned by the increased resolution in colour broadcasting which could be showcased by the artwork; *Cosmos* exploited embryonic computer graphics and then-new concepts of virtual reality; *Planet Earth* took advantage of new high definition broadcast standards, and Attenborough’s recent series, such as *The Kingdom of Plants*, *MicroMonsters*, and *Galapagos*, are designed for 3D. In each case, music helps give rhythm and life to static artwork, artificial imagery, and even vast expanses of savannah inhabited by herds of wildebeest. In doing so, documentary music draws on a long history of musical representation in other media, from theatrical traditions to the last century’s



development of narrative cinema.¹⁵ Similarly, music can be used to anthropomorphize animals and give emotive qualities even to seemingly impassive processes like chemical reactions and the attraction of particles through magnetism or gravity.¹⁶ Music has a connotative power far outstripping

15. Although it is worth noting that now-classic representations of the American landscape were first fused in the scores of Virgil Thomson and Aaron Copland for sometimes explicitly didactic documentaries in the 1930s — a sound routed through the cinematic genre of the Western and recapitulated in the Grand Canyon sequence of *Rise of the Continents*, where the soil erosion explained in *The Plow That Broke the Plains* in order to foster better farming techniques is the microcosm of the formation of not just the canyon but also the sedimentary rock though which it cuts.

16. An extended sequence in the 2014 revision of *Cosmos: A Space-Time Odyssey* about galaxy/star/planet formation and the seeding of life is set to Ravel’s “Bolero,” a piece of music originally written for a dance (its name is literally generic, a form of flamenco dance based on a particular rhythm). The repetitive, slowly crescendoing music

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any meagre denotation, and its associations have been developed across centuries and across a broad range of media. Documentary is not so much a structural or formal genre as a conceptual one, and may likewise draw on a number of modes of representation to present its information, and those modes almost always come with music. The musical saturation of the BBC documentary format is part of its “prestige,” but also guides reception in a way that is both persuasive and that doesn’t “leave fingerprints” in the form of explicit statement or image.

Teaching is similarly a blend of entertainment and information; some might even uncharitably call it a bait-and-switch, but in truth, it is about engagement. In an era of media saturation and information at our fingertips, the strategy of the teacher is often to find that “wow!” moment that can engage and draw the student/audience in for the explanation, and to impart the explanation so the revelation builds rather than diffuses that engagement. It is akin to reverse-engineering, taking an object or event and gradually disassembling it, but creating a careful diagram of relationships as well as positions. Music can bind objects and subjects together, but it can also be used to “explode the diagram” and to highlight and explore relationships.

Iain Stewart himself once explained his decision to give up acting and become a geologist as coming to the realization that teaching was “just performing but with a steady income” (“Meet Iain Stewart”). His performance of the excitement of learning is something that many of us who teach will recognize, and is a primary aspect of the “personal view” documentary style led by a charismatic teacher. In the series Stewart has presented, the most basic aspects of learning (gathering and assembling information, finding connections, and finally understanding) have been increasingly externalized through a combination of graph-

became a metaphor for sexual intercourse (i.e., reproduction, or the seeding of life) long before it was parodically memorialized in the movie *10*. But at an even finer level, the music bears a striking kinetic similarity to orbital motion (circling and bound by attraction) in the obsessive circularity of the “hypnotic” melodies and triplet-based triple-meter rhythms, driving through the measure to the downbeat but also floating at a higher metric level.

ics, editing, and camera technique, given shape and direction by analogous use of sound and music.

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