

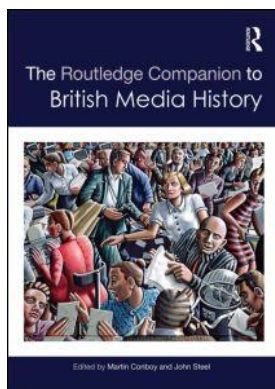
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The origins and practice of science on British television

Timothy Boon and Jean-Baptiste Gouyon

Both science and television have been extraordinarily powerful forces for economic, social and cultural change in the period since 1945. It follows that the television representation of scientific and technological subjects should be an exceptionally potent subject for revealing core elements of our culture. And yet science television has until recently been the province of a very small coterie of scholars. As a result, what we know about the story of the history of science on television is uneven. However, especially in a volume of this breadth, where it is possible to draw comparison with other fields, it is important to ask what it has meant, over the substantive period of British television history, to present science, specifically on television. But we must work with what we have, and this essay follows the weight of the literature in covering the period before 1980 in significantly more depth than the last few decades.

What has it meant to viewers to experience science television programs?

The fundamental point about the history, institutions and influence of television is that it was the growth of viewers that drove its development. Television license holders increased 300-fold in the key years of expansion between 1947 and 1955, by which date 4.5 million homes had sets; there were 13 million by 1964 when BBC2 started; in 2009–10, 25 million licenses were in force. All the same, it is difficult to make direct links between these bald figures and the experience of viewers of science television programs. One approach is to look at the intended, or ‘inscribed’, audience by studying the programmatic statements made by producers about the viewers they expected and the mode in which they expected the programs in question to be viewed. Gordon Rattray Taylor, editor of *Horizon* between 1964 and 1966, for example, was keen that the program should provoke “the sort of conversation which springs up when a scientist and a non-scientific friend get talking over a beer, a coffee or a glass of after dinner brandy” (Taylor, 1964). Aubrey Singer, the Head of Department, similarly asserted that in science broadcasting “the level of

communication is between equals in intelligence: to an audience that is well disposed toward, but with no special knowledge of, the subject matter” (Singer, 1966: 13). In the foundation of *Horizon*, the producers also banded about, at the level of metaphor, different magazine titles in seeking to establish the appeal of the program – was it more like *Scientific American*, *New Scientist* or *Encounter*? And, over its first five years, it oscillated between these different modes (Boon, 2014).

Natural history television, for its part, was thought of along the lines of what we would call now a top-down model of science communication. This is suggested by the words of Desmond Hawkins, the head of West Region programs, who founded the BBC Natural History Unit (NHU) in 1957. With its natural history programming, he said, BBC television “has brought [into British homes] a reliable flow of expert comment and factual report [...] films of bird-life and animal behaviour which equip us with a range of knowledge that a Bewick or a Gilbert White might envy” (Hawkins, 1957: 7). And although in 1962 Hawkins put out, as a warning to “idealist enterprises” (Hawkins, 1962: 2), the dictum that “the first aim of a prestige program should be to win an audience” (ibid.), it is notable that one early participant in natural history television, James Fisher, recalled in 1959 in relation to the program *Look*, that:

None of the distinguished naturalists and cinematographers whom Peter Scott has introduced talk down to their public. Indeed, they talk not to their public so much as to each other in the relaxed yet lucid voices that they would use in any normal discussion of their profession amongst themselves. The fact that by so doing they capture and please their audience is itself proof that natural history needs no aid to acceptance ...

(Fisher, 1959: 9)

Audiences for natural history television were thus imagined as passive witnesses to a learned discussion rather than as active interlocutors in this discussion.

In conjunction with imagining their potential audience by comparison with print journalism, producers and managers also considered audience questions by debating issues of the comprehensibility of programs. It is clear that the intrinsic difficulty of science was an issue in programming, but not necessarily in a negative sense; it is as though they saw a kind of ‘aesthetic of difficulty’ in which the abstruseness of science could be part of its appeal. This had been seen in 1949 when a special enquiry was commissioned into the comprehensibility of a radio broadcast, where one of the striking findings was that “interest was not confined to any one group but was found in all and was, in fact, most strong where the content of the broadcast was only partly understood” (Boon, 2008: 189; Jones, 2013a). Difficulty was also an issue when the long-running series *Eye on Research* was canceled in 1962. Richard Hoggart has argued that notions of elevated quality in television have often been aligned with perceived levels of ‘difficulty’ (Hoggart, 2004: 116). Science television has often occupied this niche of perceived quality linked to abstruseness of subject matter.

More directly, it is true that the BBC did undertake a significant amount of viewer research, and so the archives do often hold audience response reports for many of the programs and series that were broadcast. These reports, typically around two

pages in length, show the responses of a panel of viewers to the program in question. They are headed by the ‘reaction’ or ‘appreciation index’, effectively a percentage quality rating by viewers, followed by selected comments. For example, the report on the episode ‘Patterns of Heredity’ in the series *Eye on Research* (24 May 1961) had a ‘reaction index’ of 75; one of the recorded comments reads:

“All in favour of programs of this type. The general public are, for the most part, unaware of research activity in this field. Television is the answer to this lack of knowledge”: thus did a Docker sum up his appreciation for this program.

(Anonymous, 1961)

It is, however, important to grasp that these reports were not so much designed to shed light on the subjectivity of the science program viewer as to audit the effectiveness of the production process. It would, all the same, certainly be possible to conduct an extensive analysis of these reports and to gain a greater insight into the reaction of selected viewers over time to science as to other television programs.

There is no evidence, either, that the scientists involved in science broadcasting gave much consideration to the audience; they too were much more concerned with the ways in which science should be propagated than with what kinds of programs the viewers might prefer to watch, understand or enjoy.

What have science television programs meant to scientists?

If the historical study of audiences for science television gives few leads, then more is known about the other participants in science television: the scientists themselves and television producers. The post-war period saw a distinct increase in scientists’ interest in moving image media (Boon, 2008). Compared to the pre-war period, when only a small number of scientists became actively involved in documentary film-making, from the 1950s scientific élites actively sought out a presence on television. In this Cold War world, where the atomic bomb, new biological science and automation seemed in different ways to threaten the stability of society and culture, there was a job to be done as never before in conveying the positive role and contributions of scientific research to the public. Even before television began to reach substantial British audiences from the time of the Coronation in 1953, science was one of the agenda items for the newly reformed BBC General Advisory Council, seven of whose 49 members were scientists. Discussions which initially focused on radio were soon extended to include, then to be dominated by, the new medium. In 1949 the nuclear physicist Marcus Oliphant, one of the Council’s scientist members, set in train a sequence of interactions between élite science and the BBC. He initiated a debate on the broadcast representation of science by calling for the BBC to appoint an advisory committee on scientific broadcasting and to employ more scientists as producers. After careful internal discussion there resulted an unhappy two-year period in which the senior biomedical scientist Henry Dale was employed as scientific advisor to the BBC. This only seems to have demonstrated the intrinsic problems of

the advisor model, where such an individual is expected to compel respect but is not part of the normal management hierarchies of the broadcaster. It also revealed the main and continuing problem in discussions between these two professional groups: that for scientists and broadcasters to argue about the representation of science in broadcasts tends to lead to contests of professional expertise (Jones, 2013b; Boon, 2008). Individual scientists appeared in television programs, where relations with individual producers were often cordial. But this did not prevent institution-level relationships from being quite troubled; repeatedly, in 1958, 1961 and from 1985, organized elite scientists sent delegations to, or otherwise directly communicated by other means with, the most senior staff of the Corporation to complain that there was too little coverage of science, or that it was done ineffectively, or without sufficient control from the scientists themselves. The Corporation was always careful to manage its responses to ensure that control over the medium was never ceded to their petitioners. The scientists, who stressed their cognitive expertise, would have preferred to have charge of how science was shown on television thereby expressing a wish to control the public relations of science. To achieve this aim they very often favored series of something closely akin to broadcast courses of lectures in basic science. There is also some evidence that the different interest groups within science and engineering were also fighting battles between disciplines (Boon, 2008: 221).

The BBC Natural History Unit, on the other hand, had been careful to maintain strong links with scientists. One of the dreams of Desmond Hawkins throughout the sixties was that it would become a kind of hybrid institution where scientists would do research and television producers would make programs about their work. This never materialized but in 1962 Hawkins could report that scientists actively sought the participation of the Unit in their activities, through invitations to either participate in congresses, or to contribute papers to scientific journals. And “in one notable case (the return of the Osprey as a breeding species)”, revealed Hawkins, “our programme research was more comprehensive than the entire literature” (Hawkins, 1962: 3). This suggests that to the scientists interested in animal behavior, the BBC NHU was seen as a participant in the knowledge-producing activity rather than simply a mediator between them and non-specialist audiences.

What has it meant to broadcasters to make science television programs?

For the senior staff of the BBC, science was among the interests they needed to address, as the Director General, Sir Ian Jacob, wrote in 1956: “Our national position depends a great deal upon our standing with that part of the nation which is responsible for and actively concerned with political, economic and scientific matters (Jacob, 1956). In their responses to the approaches of scientists, program producers for their part tended to stress that the use of television as a medium was their professional expertise and property (Jones, 2013b). For example, in response to a 1958 Royal Society-British Association delegation to the Director General, the leading producers of science television in the Talks and Outside Broadcast Departments, James McCloy and Aubrey Singer respectively, prepared statements about their production processes. Both producers emphasized the importance of their access to

senior scientists and how the views of scientists at the Royal Society, for example, led them to interesting work to report. McCloy expressed his respectfulness towards science directly, whilst asserting the importance of interesting the viewer: “Whatever the showmanship involved in presentation, the program aims at being entirely responsible in its treatment of science. It must be responsible not only in question of fact but also in selection and emphasis, and earn the good will of the scientific profession” (McCloy, 1958). In choosing stories to cover, Singer stressed suitability for the medium and McCloy favored the importance of choosing only subjects that were comprehensible to the audience (Boon, 2008: 222).

In discussions with scientists like these, the producers hammered out the BBC’s policy, and this was expressed in a public lecture in February 1966 by Aubrey Singer:

Those of us engaged in broadcasting science to a general audience are forced to frame our attitudes in the light of this world we see around us. [...] We place ourselves so that the inbuilt vested interests can be viewed as objectively as our own unconscious leanings of background and upbringing will allow. To this end, as a foundation to our policy, we have firmly decided that the broadcasting of science shall be in the hands of broadcasters.

(Singer, 1966: 8, original emphasis)

Here he voiced with particular directness the view of the producers: that “the aim of scientific programming [...] is not necessarily the propagation of science, rather its aim is common with all broadcasting, an enrichment of the audience experience” (ibid.: 9). For him, “the televising of science is a *process of television*, subject to the principles of programme structure, and the demands of dramatic form. Therefore, in taking programme decisions, priority must be given to the medium rather than scientific pedantry” (ibid.: 13, original emphasis). 1966 also saw the foundation of the BBC’s Science Consultative Committee, a concession to the scientists who had lobbied for more influence over science broadcasting in the context of the Pilkington Committee into the Future of Broadcasting. Broadly speaking and as far as the detailed research conducted so far allows us to see, the effect of this six-monthly meeting was to neutralize the tension between elite science and the BBC by providing a forum in which the scientists felt that they were listened to. Meanwhile, relations between individual scientists and journalist-producers tended to be businesslike, even cordial, and the coverage of science was generally positive, and certainly very rarely critical.

In Bristol, Desmond Hawkins defined how the Unit should relate to scientists in a way that would encourage collaboration on an equal footing, but at the same time establish a strict boundary between the process of television-making and science and, at the same time, a clear division of labor between television producers and scientists. To the former program-making, to the latter the production of the raw material from which programs are made:

In handling this subject we expose ourselves to the critical scrutiny of scientists, and their approval is an important endorsement. Moreover, it is their

work that throws up the ideas and instances and controversies from which programmes are made. We look to them as contributors, as source material, as consultants and as elite opinion on our efforts. In short we need their goodwill.

(Hawkins, 1962: 7)

The televising of natural history was thus defined as a way of knowing and of producing knowledge rather than as a matter of translating the knowledge produced by scientists.

Who were the producers?

At the BBC, science and technology programs were produced by several different departments, mainly settling down as the responsibility of Science and Features in the 1960s. Responsibility for natural history, by contrast, was separately located in a specialist department established in Bristol at a distance from London, the main production centre. The conventions that grew up in natural history television were also different in mode, as its proponents made claims that it not merely *represented*, but actually *did* natural history by making television programs.

The televising of natural history on the BBC was started in the 1950s by naturalists who saw in the medium a means of bringing natural history to a larger audience than their network of public lectures had previously been able to achieve. They were primarily naturalists making films. And they left a mark, although in later years they were marginalized because the production of natural history television programs became a profession. The first professional producers of natural history programs, foremost amongst whom was Christopher Parsons (1932–2002), learned their trade from their interactions with these naturalists and were in this way acculturated to natural history. Second, from the start, the Bristol unit was always part of networks of natural history and participated in a vivid local tradition of natural history (Davies, 1998). As Hawkins noted in 1962, “the [West] Region itself is generally regarded as a ‘naturalists’ paradise’: it offers [...] a vigorous tradition of field-work by local naturalists” (Hawkins, 1962: 1). It thus appears that doing natural history television was, and remains, a specialism.

By contrast, across most of our period, television producers saw the making of science television as like making any television program. This is visible from the time of the 12-part series *The World is Ours* (1954–56), five of whose episodes were on broadly medical or scientific themes. These were produced by the generalist Norman Swallow, with the first generation documentarist Paul Rotha in the background as Head of the Documentary Department (Boon, 2008: 204–7). In the 1950s, it is true, alongside these generalists there were a few individuals, notably James McCloy, who specialized in science programs, in McCloy’s case, *Inventor’s Club* (1948–56), *Frontiers of Science* (from 1956) and *Science is News* (from 1958). But Aubrey Singer, who became the key figure in the development of science television, took a distinctive approach. What he did was to alight on science as a subject that wasn’t being terribly energetically pursued elsewhere and – despite

having no qualifications or background in science – built his career on science by creating new televisual forms around it. As a producer within and ultimately the Head of the Outside Broadcast Department, Singer pioneered a type of live television science program, a ‘built OB program’ created to be transmitted from particular locations, unlike conventional OBs that televised existing events such as state occasions. First he produced the 1957 spectacular live special broadcast on the eve of the International Geophysical Year, *The Restless Sphere*, a program that included narration from the Duke of Edinburgh and Richard Dimbleby and several live OB feeds from different parts of the world. Other specials followed, but the breakthrough series for regular science broadcasting was *Eye on Research*, which took live OB cameras to dozens of scientists’ laboratories across the country, over seven series between 1957 and 1961. The team that Singer assembled for this program, including his loyal deputy Phil Daly and the science writers Gerald Leach and Gordon Rattray Taylor, went on to be the core of the team responsible for the launch of *Horizon* in May 1964 (Boon, 2014). It is striking that of the ensuing generations of producers who started on *Horizon* – including the first, the documentary film director Ramsay Short – the majority of them passed through science programming into more general television production (Boon, 2013). Within what became the Science and Features Department, many careers began with what were effectively apprenticeships in television technique, starting with stints producing short items on *Tomorrow’s World* (1965–2003) and then production of 50-minute films for *Horizon*, moving afterwards into general production duties treating subjects that had little connection with science or technology. In other words, Singer’s assertion (Singer, 1966: 9) that “the aim of scientific programming is common with all broadcasting, an enrichment of the audience experience” has also worked the other way; that production skills developed in science could be employed across television.

How have different scientific subjects been treated by television?

In television, as in culture more generally, ‘science’ means many different things – although problems of definition need not delay the historian as it makes sense simply to use the categories used by the people we study. There have been many influential and long-running series in the last 60 plus years covering every aspect of science, technology and medicine. These have included *Tomorrow’s World* (1965–2003), *Equinox* (1986–2001), *QED* (1982–99), *Crucible* (1982–83) (see Young, 1995) and many others. Landmark series such as Jacob Bronowski’s *The Ascent of Man* (1973) have also established science’s standing as a subject for television. Medicine and public health have often enjoyed their own specialist strands in addition to featuring within mainstream science broadcasting. In the early 1950s, documentary drama was most often the preferred medium, with programs such as *Family Doctor* (3 September 1952) and *Medical Officer of Health* (21 September 1954). Medicine was also the focus of OB treatment, with the first series of *Your Life in Their Hands* in 1958 (Boon, 2011). Many series have ensued, including prominent mega-series such as Jonathan Miller’s *The Body in Question* (1978–81).

Horizon

Perhaps the dominant feature of science on BBC television in this period has been *Horizon*, with a 50-year life and more than 1,100 programs broadcast. Against this background, after a period of uncertain format and tone in its first few years, *Horizon* became the major fixture of BBC's science coverage. The first *Horizon* program, *The World of Buckminster Fuller*, was broadcast on 2 May 1964. From the outset, the editorial independence that Singer, as Head of Department, provided enabled producers to range across science and its implications, ever in search of the good story. As the media scholar Roger Silverstone noted, each episode of *Horizon* is the outcome of a unique process of construction which is at the same time contingent and creative (Silverstone, 1985: 162). Any attempt at producing statements about *Horizon* in general for a given period of time is therefore doomed to be contradicted by individual examples. Yet the 1994 *Horizon* episode *The Far Side*, which David Malone was invited to produce to mark the thirtieth anniversary of the program, suggests some trends in its coverage of science and technology. Overall, *Horizon* producers have always been concerned with reporting on science and technology. The values and beliefs informing their work are those of investigative journalism.

In an initial period, covering the half decade from 1964, the program tended to support the view that science and technology would eventually bring progress and prosperity to the world at large. This trend is exemplified in the 1964 program *The Knowledge Explosion*, featuring a sequence with science fiction author Arthur C. Clark promising that the future will be 'absolutely fantastic'. Another example is the 1966 *Man in Space*, drawing an uninterrupted path of progress from the first steps of the US space exploration program to Apollo and the projected moon landing. This trend can be seen culminating, yet with an overtly racialized tone, in 1968 with *Black Man – White Science*, in which the domination of the world by the West is ascribed to the unique features of western culture which gave rise to modern science and technology. Similarly the program *Bread* (1969) can be interpreted as a continuation of this celebratory trend. Here, western food research is praised for its efforts to 'feed the world', efforts which are only hampered, it is suggested, by 'backward looking' Third World populations. But 1969 audiences also saw programs such as *After Apollo*, questioning the military consequences of the US space program; *For the Safety of Mankind*, telling of a group of people who thought it their duty to pass nuclear secrets between the western and the eastern block in order to stop the arm race; and *Machines and People*, featuring the then Science and Technology Secretary Tony Benn, inviting audiences to reflect on the social cost of scientific and technological innovation.

Towards the beginning of the seventies, *Horizon* was taking a more critical turn that would be confirmed throughout the decade. It was thus falling in line with the critical approach to science and technology observed in other mass media for the period (Bauer and Gregory, 2007). This is exemplified in programs such as *Man Made Lakes of Africa* (1972), which was concerned with how the Volta and Aswan dams affected the environment, or *Who Needs Skills* (1974), which questioned the impact of 'progress' on social relationships in the work place.

The eighties and early nineties can be characterized as the synthesis moment of what appears a dialectical relationship between *Horizon* and the sciences. One of the main features of the period was the explosion of information and communication technologies. A string of programs including *Spies in the Wire* (1984), *In the Light of New Information* (1987), *Colonizing Cyberspace* (1991) and *The Electronic Frontier* (1993), continued questioning the social consequences and the politics of scientific and technological innovation. These programs all tended to emphasize the primacy of politics over science and technology. At the same time as these programs pointed at the dangers of unchecked science and technology, they hinted at the notion that properly controlled, science and technology could be efficient means of bettering the human condition. Thus *Horizon* seems to accompany the rise of the movement for public engagement and democratic accountability for science and scientists that took place in Britain and elsewhere in the 1990s (eg. Callon, Lascoumes and Barthe, 2009).

Natural history television

In May 1953, television set owners were invited to watch an outside broadcast live from the Wildfowl Trust at Slimbridge, an ornithological research station and the home of the amateur naturalist Peter Scott (1909–89). As the first program of its kind to come out of the BBC West Region studio in Bristol, this broadcast marks the beginnings of natural history television in Britain. It was also the opening salvo that led to *Look* (1955–68), the long-running series which, for more than a decade, embodied wildlife for British TV audiences. So much so that Desmond Hawkins could boast that:

Programmes like ... *Look* have shown that they can hold the attention of an audience of several millions. Such broadcasters as Peter Scott ... enjoy a measure of popularity that would certainly not be scorned by the more orchidaceous and spectacular stars of the entertainment world.

(Hawkins, 1957: 7)

As if the series had been shaped by the inaugural live broadcast from Scott's residence, each episode took place in a studio setting reproducing Scott's study. The first programs involved Scott showing his own films of birds and wildlife. Then, having run out of material, he invited his naturalist friends to show their footage (Davies, 2000). The conversations taking place in the studio revolved around two topics: animal behavior in the wild as revealed by the observation relayed through the film, and technical issues related to filming. Natural history television started in Britain at a time when the study and observation of live animals in the field was still a fringe practice, not yet considered to be proper science but very much the province of amateur natural historians. *Look* both installed audiences as witnesses to knowledge production and established the television studio as a place where natural historical knowledge could be gathered and discussed, under the reassuring oversight of the trusted figure of Peter Scott (Gouyon, 2011).

The NHU's next flagship program, *Life* (1965–68), was dedicated to examining all aspects of animal behavior and operated along the same lines as its predecessor. Hosted by the curator of mammals at the London Zoo, Dr Desmond Morris, it staged studio encounters between biologists so as to debate, often in a heated manner, issues related to the study of animal behavior. Audiences were thus again invited to witness the making of science, performed this time by scientists discussing their trade in a TV studio and arguing over theoretical points under the supervision of a trusted figure. But *Life* also introduced a new dimension to natural history television. The film sequences illustrating the conversations between scientists were all shot by cameramen from the BBC NHU, whose expertise lay in the mastery of film technology rather than in natural history. In other words, *Life* introduced the notion that the NHU could valuably participate, with their footage, in the scientific debate (Gouyon, 2011). We might, using Thomas Gieryn's coinage, say that the structure of the program made the television studio into a 'truth-spot', a place lending credibility to knowledge claims (Gieryn, 2006).

In 1960, ITV, the rival network, started broadcasting the series *Survival* which was produced by Anglia TV and which proved immensely successful. Whilst *Look* primarily catered for middle-class audiences, *Survival* was self-consciously pitched to attract "the great mass of viewers [...] available in the industrial areas of the Midlands and the north" (Willock, 1978: 28). With the aim of pleasing working-class audiences, the series producers, Colin Willock and Aubrey Buxton, chose to dispense with the studio-based style the BBC privileged and instead produced a film-based series.

Assessing the competitive strength of the BBC NHU in 1962, Desmond Hawkins stated that "Anglia, though a later arrival and professionally less competent, is potentially more dangerous" (Hawkins, 1962: 4). The BBC reply to *Survival* eventually came in 1967, in the shape of *The World About Us (TWAU)*, a new series similarly made exclusively on film. In its rivalry with ITV, though, the BBC in 1967 had an advantage: color. David Attenborough, who as BBC2 Controller oversaw the start of color transmissions, stated at a press conference that color television was "natural television" (Raynor, 1969). This formula, successful with critics, could imply that the BBC's representations of nature were more valuable than those found on ITV. Indeed, since the early fifties, television had been shaped as a technology of direct witnessing through such programs as *Look*. Attenborough's statement encapsulates the notion that color television is the quintessence of observational realism, in other words that the medium is true to nature. In the case of natural history programs, this statement suggested that color representations of wildlife, as seen on BBC2, had more knowledge value than those in black and white, shown on ITV.

The launch of *TWAU* in the context of the beginning of color transmission entailed a departure from the studio-centered strategy of foregrounding a trusted personality (Peter Scott, Desmond Morris) overseeing a learned conversation between experts. In its place developed an approach based on advertising the film-making process as a way of producing knowledge. From this point onward, questions of technical expertise in relation to the handling of the camera, the editing process and post-production in general became central to asserting the cognitive legitimacy of natural history television. Such a shift should not solely be ascribed to

the transition from a studio-centred culture of television broadcasting to a film-based one. It should also be understood as an expression of the BBC NHU's newly gained self-confidence in its technical ability, and a sign that the Unit had, a decade after its foundation, reached maturity.

This is evidenced, for example, in internal discussions during the negotiations that took place with Alan Root in the late sixties to secure his contribution to TWAU. Advising on the arguments Bristol should use, David Attenborough suggested as "a bargaining point" the "BBC expertise inextricably involved in the film in the shape of editing, dubbing and recording" (Attenborough, 1966). This self-confidence shaped the relationship between natural history film-makers and life scientists in a way that maintained the latter at the periphery of the film-making process, at best as advisors, or as providers of raw data on which film-makers could exert their expertise. A strict boundary was delineated, patrolled by technical experts – the natural history film-makers. This was the time, at the end of the sixties, when Robert Reid, the Head of Science and Features, could write in the high-profile science journal *Nature* that if a scientist takes over the responsibility for producing television science programs, then they have to "acquire the professional skill and experience of a producer, and devote a producer's time and energy to his program. He will cease to be a scientist. To that extent [...] broadcasting is back in the hands of the broadcasters" (Reid, 1969: 458). According to Reid, one could not be at the same time a scientist and a science or natural history broadcaster.

Conversely, in the seventies, natural history television was increasingly presented as a means of producing knowledge and of revealing aspects of the natural world that had escaped scientists' attention. This is notable, for instance, in an interview David Attenborough gave following the release of his masterpiece, *Life on Earth* (1979):

We were able, for instance, to put together views of living amphibians which no one had been able to see in that range of time ever. No zoo could show you that amount. The visual effect was devastating. It had the same effect on me [Attenborough] as it did on everyone else. I remember the first time I saw the amphibian program. I was speechless. My jaw was sagging with wonder.

(Wapshott, 1980)

The series presented natural history television as a means of turning each viewer's living room into a naturalist's study. A program is like a drawer in such a study that contains a collection of specimens. Watching the television program enables spectators "to roam freely across the universe" (Outram, 1996: 261), just like naturalists in their study. In the same interview about *Life on Earth*, Attenborough hammered it home, quoting a letter from a member of the audience who congratulated him "for reminding me why it was that I became a zoologist 50 years ago" (Wapshott, 1980). Following the 1979 release of *Life on Earth*, natural history television was in this sense claimed as the genuine heir of the original spirit of scientific enquiry. This somewhat conservative assertion was reiterated in a 1984 article about *The Living Planet*, Attenborough's second series, constructed on the model of *Life on Earth*: "The attempt to see things as a whole has largely been abandoned by laymen and

specialists alike, but Attenborough mediates between the two” (Appleyard, 1984). Following *Life on Earth*, natural history television was endowed with the capacity to convey genuine generalist knowledge of the natural world, allowing the audience to embrace it in its totality. And the logic of this mode of knowing rests on the notion that sight – observation – is the alpha and omega of the production of knowledge about nature.

The increasing emphasis on natural historical knowledge production in television from the 1970s marginalized scientists. This can also be seen in more recent natural history television, especially in the emergence of the genre of ‘making-of documentaries’ (MODs). In these MODs, such as for example *Making Waves*, attached to *The Blue Planet* (BBC, 2000), film-makers often appear interacting with scientist advisers in the field. From these sequences emerges the notion that the participants in the film-making process – natural history film-makers and field biologists – produce the knowledge they need, and that the two kinds of knowledge are complementary to each other, rather than concurrent.

Conclusions

In this essay we have sought to give the broadest account possible of science on British television, given the rather rudimentary state of the scholarship. It is evidently the case that more intensive historical study, especially of more recent decades, may well lead to substantial revisions of the picture presented here. And this will not simply be a matter of ‘big data’, but of complex cultural artefacts in their thousands that have made professional careers and developed televisual technique at the same time that, on occasion, they have also contributed to scientific knowledge whilst entertaining millions of viewers. If, as seems to be a sound judgment, Singer was correct that “the televising of science is a process of television” (Singer, 1966: 9), then the destiny of science broadcasting as a television subculture has also been bound up with the fortunes of television in general. Its producers have been obliged to follow fashions in the medium, as for example when *Horizon* producers, in common with most BBC documentary makers, were expected to adopt Robert McKee’s storytelling techniques so that they could apply his principles of storytelling as conflict resolution to making science palatable to television audiences (Lees, 2010: 130). Furthermore, in a multi-channel television environment, science television must increasingly become more like other kinds of television programming as producers seek the elusive viewer who will stay with a program for more than one 15-minute segment. What hope for ‘difficult’ television then?

Further reading

Bousé’s (2000) *Wildlife films* provides some more elements about the history of the presentation of wildlife on British and American TV. Burgess and Unwin’s (1984) essay “Exploring the living planet with David Attenborough” is a good insider’s account of the process of producing natural history TV. Tim Boon’s *Films of Fact* (2008) gives a longer historical background to the themes discussed here.

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