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'The televising of science is a process of television': establishing *Horizon*, 1962–1967

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Abstract. BBC Television's *Horizon* series, fifty years old on 2 May 2014, despite its significance to the history of the public culture of science, has been little studied. This microhistorical account follows the gestation and early years of the programme, demonstrating how it established a social and cultural account of science. This was a result of televisual factors, notably the determination to follow the format of the successful arts television programme *Monitor*. It illuminates how the processes of television production, with a handful of key participants – Aubrey Singer, Gerald Leach, Philip Daly, Gordon Rattray Taylor, Ramsay Short, Michael Peacock and Robert Reid – established the format of the programme. This occurred over seventeen months of prior preparation followed by three troubled years of seeking to establish a stable form. This was finally achieved in 1967 when the programme adopted a film documentary approach after extended attempts at making it as a studio-based magazine programme. The story has implications for understanding the social accounts of science that were circulating in the key decade of the 1960s.

> 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.
>
> Aubrey Singer, 1966[1]

In Britain, no television science series has been more influential over the last fifty years than *Horizon*, over which period more than 1,100 editions have been screened, each one viewed by millions of people. If we are to understand the place of science in British postwar culture, we need to pay attention to such a substantial body of work, and to understand its content and form. At present the three and a half chapters in my *Films of Fact* give the longest narrative account of science on British television, and that only covers the period up to 1965 in any depth at all, and the account of *Horizon* there is slight – just two pages.[2] In more focused frame there are Roger Silverstone's few

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1 Aubrey Singer, 'Science broadcasting', in *BBC Lunch-Time Lectures. Series 4*, London: BBC, 1966, pp. 1–18, 3, original emphasis.

2 Timothy Boon, *Films of Fact: A History of Science in Documentary Films and Television*, London: Wallflower, 2008, pp. 227–229.

publications from more than twenty years ago, and Felicity Mellor's work on the gendered representations of science in recent series.[3] In short, for such a significant phenomenon, the literature is sparse. The current essay is a microhistorical study of the circumstances of the programme's gestation and early years. It does not assume the outcome we know; *Horizon* was by no means certain to be broadcast at all, even as late as six months before its debut on 2 May 1964. Neither does this essay suppose that *Horizon*'s subsequent longevity should be assumed from the circumstances of its foundation. Rather – in common with *Films of Fact* – it follows the principle of the 'persistence of genres'; that combinations of concerns and televisual technique tend to be reused if they once become stabilized.[4] In the case of *Horizon*, that stabilization was vexed, and took more than three years to achieve, as the account below shows. In the sense that the founding assumptions and form continued to have currency, then, the concerns of the original production team are of more than antiquarian interest.

There are several reasons other than a golden jubilee to undertake this more detailed study. First, the presentation of science on television has often been a battleground for those with competing assumptions about how the public ought to understand science. Or, to put it another way, the politics of science have often been fought out over television programmes.[5] Second, it quickly emerges from the archive that this fifty-year-old debate on science and technology and their representation was highly sophisticated in ways that raise questions of other disciplines, such as our own, that also represent science. In particular, we encounter in *Horizon*'s approach a nuanced social account of science that bears comparison with contemporary and later accounts in the literature. Third, much of the funding for science across this period has been public and so its presentation on television is one of the means by which it has been opened to public scrutiny; historians need to pay attention to the role of television in contributing to ideas of democratic accountability for the science budget, and that can only be achieved on the basis of a sound understanding of programmes such as *Horizon*. Then, in a stronger reading, if we take up the challenge of sociologists of science, including Michel Callon, to accept the case for dialogic democracy in relation to science and technology, we will benefit from understanding historically the ways in which science communication has operated within 'delegative' democracy.[6] Finally, amongst media, it is readily arguable

3 Roger Silverstone. 'The agonistic narratives of television science', in J. Corner (ed.), *Documentary and the Mass Media*, London: Arnold, 1986, pp. 81–106; Silverstone, *Framing Science: The Making of a BBC Documentary*, London: BFI, 1985; Silverstone, 'Narrative strategies in television science', in James Curran *et al.* (eds.), *Impacts and Influences: Essays on Media Power in the Twentieth Century*, London: Methuen, 1987, pp. 291–330; Silverstone, 'Rhetoric, play and performance: revisiting a study of the making of a BBC documentary', in Jostein Gripsrud (ed.), *Television and Common Knowledge*, London: Routledge, 1997, pp. 71–90; Felicity Mellor, 'Women scientists are from Venus; the BBC is from Mars', at www.opendemocracy.net/ourbeeb/felicity-mellor/women-scientists-are-from-venus-bbc-is-from-mars.

4 Boon, op. cit. (2), p. 3.

5 For example, Boon, op. cit. (2), pp. 185–191, 221–227.

6 M. Callon, P. Lascoumes and Y. Barthe, *Acting in an Uncertain World: An Essay on Technical Democracy*, Cambridge, MA: MIT Press, 2009. See also the discussion in M. Bucchi, 'Of deficits, deviations and dialogues: theories of public communication and science', in M. Bucchi and B. Trench (eds.), *Handbook of Public Communication of Science and Technology*, London: Routledge, 2008, pp. 57–76.

that television has been the dominant vector by which science has been made public in the period since the Second World War, the period in which science's power and scale have also been greatest.

After a detour into the preceding style of BBC television science programming, coverage of the flux in programming at the BBC in the early 1960s, and biographical sketches of the core group of people involved in *Horizon*, this essay follows the genesis of the programme in microhistorical style before considering a series of early programmes and presenting a conclusion that summarizes the sources of the programme's very particular account of science. In so doing, I aim to provide a firm basis for situating the televisual representation of particular and specific aspects of science and technology since 1964.

The main trend in 1950s science TV

To understand *Horizon* as science television, it will help to look briefly at what went before. In the 1950s, science programmes emerged from competition between different BBC production departments – Documentaries, Talks and Outside Broadcast (OB). The dominant trend in non-fiction television from the time television restarted after the war in 1946 was to emphasize live broadcasting, whether studio-based or outside broadcast, not the complete-on-film-before-broadcast style that came to be the signature *Horizon* style in 1966–1967. For example, from James McCloy of the Talks Department came *Frontiers of Science*, an irregularly broadcast science news programme, with a presenter and scientific participants in the studio, often demonstrating scientific principles, with film inserts 'telecined' into the broadcast during transmission. The competing approach from Aubrey Singer and his associates in the Outside Broadcast Department was symbolized by their *Eye on Research* programme. This live series, which took outside-broadcast equipment to laboratories and research stations, was the real breakthrough for regular science programming, generating over forty programmes in seven series between 1957 and 1961. Producers classified this kind of output as 'built OB programmes', those created to be transmitted from particular locations, as opposed to conventional OBs that televised existing events such as football matches. In the producers' minds, there was a deliberate association between the liveness of *Eye on Research* and a sense of being up to the minute in scientific research, even though the broadcasts, always mediated by a reporter (Raymond Baxter after the first series), tended towards telling rather than showing. Baxter was mediator in the sense that as proxy for the viewer he deployed techniques of simplification, translation and reiteration to convey the science represented. But, for all that *Eye on Research* promised to get close to science in the laboratory, it is not the case that science in action was seen as an ethnographer – for example – would see it. In fact the programme was heavy on the explanation of science.[7]

7 Boon, op. cit. (2), pp. 215–221.

Origins of *Horizon*

The idea for *Horizon* arose in the context of a review of scientific programming. Donald Baverstock, then assistant controller of television programmes, mentioned in passing in a long memorandum on future programmes in November 1961,

> My suspicion is that the place for science built O.B's should be within one big science production team and not necessarily identified with O.B. department. Competition between built O.B's and Talks, which is inevitable with departmental separation, shows few signs of producing good effects and certainly produces some worrying effects on our output. This is not of immediate concern, though it may become so about March of next year.[8]

Congruent with this, in April 1962 a decision was made to drop the projected eighth series of *Eye on Research* programmes.[9] The reasons for this are not explicit in the record, but both competition for audiences and the technical level of the programme may have played their part. In the early 1960s, BBC managers were acutely aware of competition for audiences with ITV; Wednesdays – when the programme aired – were considered problematic in this respect.[10] Baverstock had also commented that

> it is right that we should *take a risk on the intelligibility* of 3 science programmes from O.B. Department. But we ought to be in a position where we can risk these alongside ten strong possibilities [whereas] nearly all the proposals are wobbly and uncertain entities.[11]

As expressed here, for him science made for difficult television, and he was looking for stronger and more generally intelligible science programming.

With their main series off-air, the BBC's scientific output was dominated by fewer and longer programmes,[12] including several programmes produced by Daly in which Dr Stephen Black (1912–2006/7) interviewed professional groups.[13] These included *The Prizewinners* (11 December 1962), which featured that year's Nobel winners in chemistry and medicine: Max Perutz, John Kendrew, Francis Crick, James Watson and Maurice Wilkins;[14] and *The Cosmologists* (12 March 1963), where his interviewees

8 Baverstock to CP Tel, 'Our future programmes', 22 November 1961, pp. 3–4, T16/149/3, BBC Written Archives Centre, Caversham. All archival references are to this archive.

9 Edward Caffrey (assistant head of copyright) to Robin Lowe, 30 April 1962, TVART1 GRT (hereafter TVART1 GRT). Singer was still planning programmes as late as 12 September 1961; Singer to Kusakov, 12 September 1961, T14/1502/6.

10 Eric Maschwitz to GMOBTel, 9 January 1962, T16/149/3.

11 ACPTel to CP Tel , 22 November 1962, 'Our future programmes', T16/149/3. My emphasis. Baverstock became chief of programmes for BBC1 after the reorganization; effectively Peacock took his place in the management chain.

12 Caffery to Lowe, 30 April 1962; Singer to CP Tel, 'OB Department: Scientific writers', 2 August 1962, TVART1 GRT.

13 Stephen Black (MRCS, LRCP), one-time documentary filmmaker, doctor and psychologist, with interests in psychosomatic medicine; anon., 'Stephen Black (obituary)', *New Zealand Medical Journal* 120(1248) (26 January 2007), http://journal.nzma.org.nz/journal/120-1248/2390/content.pdf, accessed 16 November 2013. Black was author of books including *Man and Motor Cars* (1966) and *Mind and Body* (1969).

14 See P. Green, 'Scientific breakthrough (critic on the hearth)', *The Listener*, 20 December 1963, p. 1062.

were Fred Hoyle, Hermann Bondi, Margaret and Geoffrey Burbridge and Sir Bernard Lovell.[15]

Very soon, the major context for these discussions became the corporation's response to the government's Pilkington Report on the Future of Broadcasting, published on 27 June 1962. This granted the BBC a second channel with a brief to complement the existing BBC and ITV television channels, using the better picture definition promised by 625-line UHF transmission and, eventually, colour. (Up to this point, broadcast had been on 405-line VHF in black and white.)

Key players

Defining the programme that very quickly gained the title *Horizon* became a shared project of several participants: Aubrey Singer, Philip Daly, Gerald Leach, Gordon Rattray Taylor and Ramsay Short, with interventions from Michael Peacock, chief of programmes, BBC2.[16] For clarity, each is introduced here, even though this anticipates some of the narrative. Each individual had subtly different expectations of what the programme should be. Aubrey Singer (1927–2007) was, in many ways, the key figure in the development of BBC science television. He had originally joined the Outside Broadcast Department in 1949, but had taken positions in Scotland and the corporation's New York office before rejoining OB in January 1957. He himself dated the Outside Broadcast Department's 'first incursion' into science to 1957, alluding to his ambitious programme on the International Geophysical Year, *The Restless Sphere*.[17] A highly competitive individual, he used *Eye on Research* as the vehicle to gain supremacy over other departments in science broadcasting.[18] He became assistant head of outside broadcasts programmes in July 1959, head of outside broadcasts feature and science programmes in June 1961, and head of OB features and science from January 1963, in the same reorganization that brought Michael Peacock into post as the head of BBC2, then in its planning stage.[19] Singer's interventions in the character, quality and contents of the programme were present throughout the discussions, despite his wider management role, and it was often his guidance that the others were implementing.[20] Philip Daly (1924–1987) originally joined the BBC in 1948, working for them in Singapore and returning to the BBC Overseas service in London in 1955, where he made radio science

15 See critique in T14/1644/1. See P. Green, 'A night with the stars (critic on the hearth)', *The Listener*, 2 March 1963, p. 528.

16 With effect from 4 February 1962; Asa Briggs, *Competition: The History of Broadcasting in the United Kingdom*, vol. 5, Oxford: Oxford University Press, 1995, p. 389.

17 Singer, op. cit. (1), p. 3.

18 This competitiveness was visible, for example in 1959, when he made moves to stop the broadcasting of *Science Is News*, a programme produced by James McCloy for the competing Talks Department; Singer to AHOBTel (II), 10 January 1959, T14/1502/2.

19 Aubrey Singer personnel file L2/191/2 (the 1963 date is 23 January); Briggs, op. cit. (16), pp. 389–390; Michael Leapman, 'Singer, Aubrey Edward (1927–2007)', *Oxford Dictionary of National Biography* (2011), at www.oxforddnb.com/view/article/98830, accessed 17 October 2012.

20 One example: in February 1964 he sent a proposal to cover science spending priorities in the context of CERN; Singer to Daly, 7 February 1964, T14/3,316.

programmes before effectively becoming Singer's deputy, joining him in OB television in 1957, where he was assistant producer on *The Restless Sphere*. He produced many of the *Eye on Research* programmes from the third to the seventh series; that is, up to June 1961. Thereafter he produced several miscellaneous science programmes, including the Stephen Black programmes. He was in charge of the *Horizon* project during its gestation and its first editor, although he was moved to a broader role from June 1964.[21] He followed Singer as its head of science and features in 1973.[22] Gerald Leach (1933–2004) was an experienced science writer who had spent two years as a BBC studio manager from 1955 before becoming a science reporter for *The Guardian*. He wrote scripts for, and latterly (after a stint by Ritchie Calder) presented the early ITV popular-science series *It Can Happen Tomorrow* (1958 onwards) for Anglia TV.[23] This was the source for his 1962 book *Science Shapes Tomorrow*, which, like the series, sought to emphasize fundamental science rather than 'the super-gadgetry approach of so much popular science', with chapters on nuclear research, power, radio astronomy, computing, DNA and population pressure on food supplies.[24] Leach co-produced much of the 1960 series of *Eye on Research* that celebrated the Royal Society's tercentenary, as well as scripting the Jacob Bronowski-fronted 1960–1961 BBC series *Insight*.[25] Gordon Rattray Taylor (1911–1981) studied natural sciences at Cambridge and became a journalist and science writer, well known for his books, including, before his BBC stint, *Sex in History* (1954). During his BBC period, he produced the book derived from the *Eye on Research* series[26] and his Thames and Hudson picture history of biology, *The Science of Life* (1963), where he 'tried to spotlight crucial moments of intellectual insight and experimental observation, and to convey what manner of man it was who made the leap'.[27] Afterwards he produced, for example, *The Biological Time Bomb* (1968). He had been brought in by Singer as a writer on *Eye on Research* from the very first programme in November 1957, and was the contract writer on the series thereafter. Afterwards he worked on a variety of programmes for Singer; for example, he scripted – and subsequently advised on – several issues of the annual science review programme *Challenge*.[28] Though a freelancer like Leach, he gained the post of chief science assistant

21 A memo records that a crucial discussion was held between Singer and Daly on Friday 22 May; Daly to Singer, 27 May 1964, T14/3,316/1.

22 Biographical Details, anon., 'Former head at Bristol', *Ariel*, 8 August 1987. Obituary, *The Times*, 3 August 1987, differs in some details.

23 Pearce Wright, 'Gerald Leach: science journalist whose feel for the human dimension drew him to environmentalism', *The Guardian*, 21 Jan 2005, available at www.guardian.co.uk/science/2005/jan/21/obituaries.pressandpublishing.

24 'By *popular* I mean that the programmes were meant primarily to be entertaining: rather than the lecture hall approach we were more than prepared to use cartoon film or tricks with the television camera. And by *fundamental* I mean that we tried to go further than the super-gadgetry approach of so much popular science presentation and to look as well at the basic and beautiful patterns and structures of nature which science has revealed in the last decades.' Gerald Leach, *Science Shapes Tomorrow*, London: Phoenix House, 1962, p. 13.

25 RCONT12 Leach, Gerald, 1963–7.

26 Gordon Rattray Taylor, *Eye on Research*, London: John Murray, 1960.

27 Gordon Rattray Taylor, *The Science of Life: A Picture History of Biology*, London: Thames & Hudson, 1963, p. 5.

28 For example: 2 January 1962, 1 January 1963, 30 December 1963.

in April 1963, 'in order to widen the whole coverage of science on television, with the needs of the Second Channel particularly in mind'.[29] He was made editor of *Horizon* from 16 June 1964,[30] seemingly as an indirect consequence of Singer's promotion to head of department, and after Daly moved to general duties. From 26 August 1963, another key player joined the team: Ramsay Short (1930–1978) was appointed to work on *Horizon*, the only member of the initial production team with a substantial background in film rather than television and, perhaps crucially, without the experience of *Eye on Research* as a direct reference point. Qualified as an architect, he had practised for four years before becoming an assistant art director at Rank, then in 1956 a producer–director at the Shell Film Unit, the respected specialist science and technology unit.[31] The four Shell directorial credits listed in Short's BBC application include *A Light in Nature*, the more significant of two films made by Shell to mark the Royal Society's three-hundredth anniversary in 1960.[32]

The sense is clear of the programme being developed by this clique of popular-science writers and television producers. For example, in early March Singer proposed an out-of-town session on 25 and 26 March 1963 with 'all of us engaged in the production of scientific programmes', namely Singer, Taylor, Leach and Daly, to 'thrash out all our problems to do with Channel 1, Channel 2 and Adult Education'.[33] It is safe to assume that Singer, Daly, Leach and Taylor – all of whom had had key roles in *Eye on Research* – would have been defining the new programme in relation to that experience; whatever the new programme would be, it could not be a live Outside Broadcast visit to laboratories to speak to scientists at the bench. Short brought a distinctively different set of concerns: those of the filmmaker who had already come into contact with elite scientists at the Royal Society. Perhaps also *Horizon* had to avoid being 'difficult' too, if we assume that Baverstock's comment on the intelligibility of science programming was at all widespread in the BBC's management.[34]

The approach: science as ideas or science as culture

For *Horizon*, Aubrey Singer and his team worked to develop a new kind of science programme, different in style from *Eye on Research* and from science programmes produced by the Talks Department. The first step in defining the approach was a letter in late November 1962 – seventeen months before the eventual first broadcast – from Singer to Leach: 'since you have time on your hands at the moment I wonder if you could

29 Taylor to Facilities Unit, 30 July 1963, T14/3,316/1.

30 Singer had asked him in April, before the series started; Taylor to Singer, 'My secretarial support', 30 July 1964, TVART3 Gordon Rattray Taylor.

31 Biographical information from Short's BBC personnel file, L1/2,024/1.

32 L1/2,024/1. See Tim Boon, 'British science documentaries: transitions from film to television', *Journal of British Cinema and Television* (2013) 10, pp. 475–497.

33 Singer to Taylor, 11 March 1963, TVART1 GRT.

34 The comprehensibility of science broadcasts had been considered as early as 1949; see Boon, op. cit. (2), p. 189, pp. 219–25; Allan Jones, 'Clogging the machinery: the BBC's experiment in science coordination, 1949–1953', *Media History* (2013) 19, pp. 436–449.

turn your hand to a knotty little problem'.[35] The letter implies an element of coercion from Singer's superiors: 'It seems that the time has come for us to widen our scientific output'. He went on to argue, 'I think that one of the things that we ought to investigate is the possibility of a sort of scientific "Monitor"'. In other words, from the very first discussions, Singer was not thinking of existing science formats, but was intent on reproducing some of the approach and success of the arts magazine programme *Monitor*, which had been running since 1958, edited and presented by Huw Wheldon.[36] Its televisual rubric was to have an engaging anchorman in the studio presenting and linking generally three diverse items, some of which – including interviews – might be live in the studio; others which combined studio with film inserts; and the remainder, which were short films complete and telecined during the broadcast. Singer expressed the implications of proceeding in this way as creating a programme

> dealing with scientific topics which have philosophical impact on other fields of the arts and humanities … It would be a programme which would try to reveal the mind of the scientist in action in regard to the rest of society, and the social sciences would come into this very heavily.[37]

Finally, he expressed his sense of the programme's significance: 'I do hope this project interests you because I think it is of vital concern to the BBC and the world of science generally, and I also want to keep it in OB department hands'.[38] His appeal to 'the world of science generally' was astute, and informed by relations with elite scientists dating back nearly six years, which mingled personal cordiality with institution-level hostility, recently reopened in the BBC's response to scientists' evidence to the Pilkington Committee.[39] Singer's reference to his Outside Broadcast Department was a typically frank expression of the long-term rivalry that existed with the TV Talks Department.[40] Singer asked Leach to propose a title for the new science programme, an editorial policy, and some sample programmes culled from scientific magazines (he suggested a sample programme might have an item on Lysenko, a profile of Arthur Eddington and a piece on the physics of violins).[41]

From very early on the participants also discussed the potential programme with individual scientists. For example, Daly, evidently after a discussion with Singer on the *Monitor* prototype, wrote on 18 December to the food scientist Magnus Pyke stating, 'we are anxious to discuss with scientists like yourself the shape such a programme might have'. Bringing out the emphasis on steering away from science news, he added, 'we visualise it as the science equivalent to "Monitor", and it would deal more with ideas

35 Singer to Leach, 26 November 1962, T14/1,810/1. Leach was between programmes – this is before Singer failed to get him on the staff. Singer to GMOB Tel, 'Gordon Taylor and Gerald Leach', 9 January 1963, TVART1 GRT.

36 John Wyver, *Vision On: Film, Television and the Arts in Britain*, London: Wallflower, 2007, pp. 27–31.

37 The social sciences did not feature very strongly in the end.

38 Singer to Leach, 26 November 1962.

39 Allan Jones, 'Elite science and the BBC: a 1950s contest of ownership', *BJHS*, available on CJO 2013 doi:10.1017/S0007087413000927; Boon, op. cit. (2), p. 225–227.

40 See Boon, op. cit. (2), pp. 215–216.

41 Singer to Leach, 26 November 1962.

and current thinking in science than with topical items as such'.[42] He similarly wrote to the psychologist Richard Gregory in August 1963 about a second pilot.[43]

The feasibility study that Leach wrote in response to Singer's letter – undated, but clearly from very early in 1963 – is a thoughtful summary of the issues and potential, and it was here that the name *Horizon* first appeared as one of five potential titles.[44] This document was in many ways the wellspring of the programme as it developed and so it is worth looking at in some detail, especially as, in responding to the idea of following the *Monitor* prototype, it set the terms of subsequent discussions. Here – as throughout – the texture of the language is significant; each of the protagonists is revealed from the archive as holding slightly different assumptions, and these differing views contributed to the form the programme took. Leach translated Singer's terminology of the 'philosophical impact on other fields of the arts and humanities'; he wrote that 'one must look at the differences that there are bound to be between any form of "cultural" science programme and a cultural programme such as Monitor'.[45] The words 'culture' and 'cultural' reappeared frequently in ensuing discussions as the different actors took up their positions.

Leach looked in some detail at the differences between *Monitor* and the proposed new programme, suggesting that the differences of arts and sciences 'will certainly limit the choice of subjects, of people, and of the kinds of approaches to each item'. Significantly, in the very first paragraph, he linked this approach to science with the televisual means to achieve it: he argued that the differences between *Monitor* and the new programme 'will of course be an important factor in methods of presentation (studio/film and so on) and on the general level and style'.[46] The issues of presenting science – as compared with art – as he saw them related to activity and visuals, variety, language, controversy, backgrounds and relative impact. In the first case, artistic activities made a good backdrop to an artist's overdubbed 'thinks talk', thus removing the need for 'direct-to-camera description or explanation'. By contrast, most scientific activity did not, he felt, have the same appeal; 'in short', he said, 'science goes on in the head'. The tools of science would be shown, 'but', he asked, 'will not the necessary explanations of what they are all about dampen interest and run the item into the danger of being didactic rather than broadly imaginative and stimulating?'[47]

42 Daly to Pyke, 18 December 1962, T14/1,810. Daly knew Pyke from an earlier *Eye on Research* contact. Singer, Daly and Pyke had dinner together on 17 January. Pyke to Daly, 25 December 1962; Pyke to Daly, 28 March 1963, T14/1,810. See www.independent.co.uk/news/people/obituary-magnus-pyke-1558840.html, accessed 22 April 2013.

43 Daly to Gregory, 16 August 1963, T14/1,810/2.

44 The others were 'Prospect, Scan, Quest, and Crucible'; anon., 'Feasibility Study for a Scientific "Monitor"', undated, but from context – that it responds precisely to Singer's brief – written by Leach and produced between December 1962 and March 1963, T14/3,316/1. This document refers in passing to the example of the 11 December 1962 *Prizewinners* programme, implying that it was fresh in the memory. Reinforcing Leach as writer is a comment in a letter a year later, where he describes himself as 'having been in on it since the beginning'. Leach to Daly, 22 January 1964, p. 3, T14/2,195/1.

45 Anon., op. cit. (44) ('Feasibility Study for a Scientific "Monitor"'), p. 1.

46 Anon., op. cit. (44), p. 2.

47 Anon., op. cit. (44), p. 2.

He feared 'a deadening uniformity between [science] items, however varied', because 'to most people, science is science', unlike the variety found in a typical *Monitor* programme. Here he concluded, building into his proposal Singer's assumption that the programme would necessarily, as with *Monitor* in relation to the arts, use a variety of subjects and approaches reinforced by a variety of techniques: 'The obvious lesson is that the items must be really varied – not only between subjects (eg different sciences, history, philosophy, politics, science and art, etc) but between approaches to subjects (eg personality as against facts)'. Then, once more, he linked this to televisual means: 'in technique (film as against studio, wild track/synch sound/silence on film, etc)'.[48]

Leach was interestingly bullish about the comprehensibility of scientific language:

> I do not think that the hoary old objection that people just cannot understand scientists need apply to a programme like this. After all, a large proportion of a 'Monitor' audience probably doesn't understand much about the 'isms' of art movements or the language of art critics.[49]

But in his view, whereas controversies in art made good *Monitor* items, there were few areas of science that could be given this treatment without the need to provide excessive background information. The novelty of science was an asset to the programme, however. The social account of science – in the sense of an account that stressed the person of the scientist – was, in his view, more problematic. *Monitor* items relating an artist's work to their life history and living or working environments were some of the most successful, whereas – apart from a few notable exceptions – he pondered, 'I honestly wonder how many scientists have personal backgrounds which are either interesting or greatly relevant to their work', though he cited some exceptions – those in *The Prizewinners*, Perutz, Oppenheimer and Bernal. And he judged that 'many scientists will refuse our approaches on the grounds that their own lives have nothing to do with their work', though he added, 'Or am I misjudging their vanity?' But he concluded that 'obviously this sort of "man of science" item should be a central feature of the programme: a great effort must be made to find suitable and interesting characters'.[50]

Finally, he argued for the importance of the impact of science on lives and world affairs; 'the ideas and advances of science … are often more dramatic, daring, imaginative and far-reaching, more stimulating', than the arts. 'That most people do not realise this – or can't be bothered to find out about them – is, surely, our greatest challenge in the programme'.[51] He then addressed topicality: the programme 'must avoid the "this is what's happening in science" approach – the "Science is News" magazine type of thing which I'm sure most people find very tedious if it lacks the grand touch. But we must also avoid the "cor blimey isn't science wonderful"'.[52]

His ideas for programmes, under six headings, included, at the more philosophical level, 'Ideas of science', which included chance and serendipity in science, and at the

48 Anon., op. cit. (44), p. 2.
49 Anon., op. cit. (44), p. 2.
50 Anon., op. cit. (44), p. 3.
51 Anon., op. cit. (44), p. 3.
52 Anon., op. cit. (44), p. 3. *Science Is News* was a programme produced by James McCloy for the Talks Department in the late 1950s; Boon, op. cit. (2), p. 212.

more social level, 'Men of science', which stressed the impact of personality and background on a scientist's work. He argued that 'the emphasis here should be on the individual man and the way his own personality, imagination and background affects the choice of his work and his own personal contributions to it. Life and work must be united – as in a Monitor item of this kind'.[53] He also recommended occasional anniversary-linked historical pieces. Specifically alluding to the shared territory with *Monitor*, 'science and the arts' included a programme idea on 'the engineer and architect' (including Buckminster Fuller), computer music composition and Singer's idea of the physics of violins. 'Science and politics' included a discussion on whether social sciences were sciences, and the individual scientist versus the team (compared with a *Monitor* item on Dudley Moore versus the *Beyond the Fringe* team). 'Controversy' included homoeopathy versus molecular biology, and his miscellaneous category included a programme idea about amateur scientists.[54]

In these months, the imminence of BBC2 was placing significant pressure on Singer's team. Singer was not permitted to extend the temporary contracts of Leach or Taylor until the output of his putative science unit could be determined.[55] An internal deadline of 1 April 1963 for submitting plans for Channel II prompted their intense work on scientific programmes. Daly, considering staffing in March, mused, 'I am not … in favour of bidding for all the Channel II science spots,[56] and one monthly magazine programme may be as much as we shall want to run'.[57]

Daly, who was in charge of developing the new programme (especially after Singer's promotion to head of OB features and science in January), wrote a key policy document in March 1963 in preparation for the April deadline. Again, as in Singer's first correspondence with Leach, *Horizon* was to be above the standard of the popular-science magazine publications *New Scientist* and *Discovery*; the intended level was 'at or a little above the Scientific American level'. He picked up Leach's argument that it 'would not be tied to topicality, but it would reflect the current trends in scientific thinking'. This alluded to an old distinction between the emphasis of the Talks Department on being closer to news than the OB science programmes chose to be.[58] 'It would above all be an ideas programme in which scientists would communicate, not with others in their own discipline, but with people in other fields. This would ensure a high intellectual level in content but an absence of jargon in exposition.'[59] In contrast to Leach's language of 'culture', Daly stressed ideas: 'the intent always must be ideas and the problems associated with those ideas'. There is no mention here of the influence of

53 Anon., op. cit. (44), p. 4.

54 Anon., op. cit. (44), p. 7.

55 This rested on the appointment of the new heads of BBC1 (Baverstock) and BBC2 (Peacock); Singer to GMOB Tel, 'Gordon Taylor and Gerald Leach', 9 January 1963, TVART1 GRT.

56 It is unclear what other science slots there were, although a pilot of a programme named 'Trend' – an industrial magazine produced by Glyn Jones – was planned in August 1963; Ruth Adams to A.C.(P) Tel, 'BBC2 magazines: facilities', 31 July 1963, T14/1,810/2.

57 He was discussing a single production office for *Horizon* and *Challenge*. Daly to Singer, 'Horizon magazine programme', 5 March 1963, T14/3,316/1.

58 See, for example, Singer to AHOBTel (II), 10 January 1959, T14/1502/2.

59 Daly to Singer, 'Horizon magazine programme', 5 March 1963, T14/3,316/1. Copy also in T14/1,810.

scientists' lives on their work, as is mentioned in the Leach document. Daly shared Leach's objection to didacticism; there should never be 'the straightforward teaching and demonstrating approach as an end in itself'.[60] We may note that the teaching and demonstrating of science was exactly what members of the scientific elite, including Lawrence Bragg, had been demanding of the corporation, and where they had achieved some success in the shape of regular 'educational programmes for adults', which in 1963 included 'an introduction to relativity'.[61] Revealing the allure of the arts programme, Daly emphasized that, 'properly edited, "Horizon" could become as big a prestige programme as "Monitor"'. Like Leach, he integrated his approach to the subject with programme technique, but for the first time specifying that 'on a monthly basis we should aim at a 45 min. spot, and within that period limit ourselves to three main items, one of which should be visually exciting ... Our field must be international'.[62] His five sample programmes followed the three-item rubric; the third, for example, combined an item on the impact of modern construction techniques on architecture, with a section on shock waves and high temperatures, and a piece on experiments with goggles.[63] In this document too there is the first suggestion of having an anchorman for the programme, and of a pilot: 'If tentative approval for the idea is forthcoming we would like to run a pilot, but before this we propose auditioning five or six possible anchormen'.[64]

In April 1963 *Horizon* moved explicitly to being an offer for the new channel, rather than being simply a differently focused replacement for *Eye on Research*. Daly wrote to Pyke that the programme

> is likely to become a Channel II programme – at least we have offered it up humbly for consideration. We are as you can imagine shuffling our cards rather carefully with the introduction of the second Channel, and science should do very well when the cards are eventually cut and dealt.[65]

By 6 May 1963, Daly was planning the pilot programme.[66] He was discussing the detailed content with Leach and Taylor, with the aim of having three items, two of which would be in the studio, and a third on film.[67]

At this point Peacock, in engineering a resolution to continuing rivalry between the Talks Department and the OB Features and Science Group, gave strong backing to

60 Daly to Singer, 'Horizon magazine programme', 5 March 1963.

61 See *Radio Times*, 5 September 1963, 9; Boon, op. cit. (2), p. 221–224.

62 Daly to Singer, 'Horizon magazine programme', 5 March 1963.

63 Daly to Singer, 'Horizon magazine programme', 5 March 1963.

64 Daly to Singer, 'Horizon magazine programme', 5 March 1963. Peacock accepted the case for a pilot in a memo to Singer on 11 June; Ruth Adams to A.C.(P) Tel, 'BBC2 magazines: facilities', 31 July 1963, T14/1,810/2.

65 Daly to Pyke, 5 April 1963, T14/1,810/2.

66 Daly to Singer, '"Horizon" pilot programme', 6 May 1963, T14/1,810. The funding of pilots was part of the general preparations for BBC2; see Head of TV Admin Dept to Director of TV, 'BBC-2 programmes: preliminary expenditure', 10 December 1963, T16/315/2. Daly to Richard Gregory, 7 August 1963, T14/1,810/2.

67 Daly to Singer, '"Horizon" pilot programme', 6 May 1963, T14/1,810.

Singer's science programme idea; he wrote to Grace Wyndham Goldie, head of the former:

> I have discussed with [Baverstock] the problems of competition between Talks Group and OB Features and Science Group in the field of a science programme for BBC 2. He and I both feel it would be best to give [Singer] his head and let him press on with his plans for a 'scientific Monitor', to be edited by Philip Daly, and ask you to work out … a regular series of programmes designed to explore the whole field of topical social science.[68]

This shows that, however similar in style it was to a Talks programme, the allocation to Singer's department amounted at this stage to a particular group of people rather than to a specific technology or style of production.

Scientific personalities

As we saw, Leach favoured an emphasis on the impact of personality and background on a scientist's work. Questions of scientific personality also had a substantial impact on the programme through the effort to select a suitable 'anchorman' – 'presenter', as we would say, although this was not explicitly in Leach's prescription. Magazine programmes used anchormen to introduce and link disparate items. Accordingly, the *Horizon* team, seeking to emulate *Monitor*, made extended attempts throughout 1963 to find suitable candidates. Daly had listed a few in his March memorandum: the economist Robin Marris (Kings College, Cambridge); the biologists John Kendrew, Francis Crick and Sidney Brenner; and potential interviewers: Lewis Walport (for biology), the science writer and then editor of *New Scientist* Nigel Calder for (physics) and Gerald Leach. It is striking that in these efforts to find anchormen they only considered academics, and not journalists or reporters. There is no mention, for example, of Raymond Baxter, who was, perhaps, too closely associated with *Eye on Research*, or Stephen Black. Taylor articulated the requirements for anchormen as he saw them: 'somebody who can talk to scientists at their own level, but who is not tied to any one science, but who can interpret the human implications'. He therefore proposed two psychiatrists, Dr A.T.M. Wilson[69] and Anthony Storr.[70] Rather differently, Daly wrote to the theoretical physicist and key figure in the establishment of the University of Sussex, Roger Blin-Stoyle, on 27 June, probably as a covert invitation to screen-test as an anchorman:

> Qualifications I would like to see in the narrator would be: (1) A scientist with a high reputation in his own field; (2) a wide, if general, interest in many other fields beside his own; (3) the ability to relax before the camera – this can only be assessed at audition.[71]

68 Peacock to Goldie, 13 June 1963, T50/52/1. The latter programme became 'Human side', one of the three programmes shown monthly in alternation with *Horizon*.

69 Taylor describes him as special adviser to Unilever on personnel problems, previously one of the management group of the Tavistock Institute.

70 Taylor to Singer, 19 June 1963, T14/1,810/2 (also in T14/3,316/1). Taylor mentions here his suggestion of the aggression item to Storr.

71 Daly to Blin-Stoyle, 27 June 1963, T14/1,810/2.

Certainly Blin-Stoyle took it this way as he replied, 'I have decided that I would indeed like to have a go at acting as narrator'.[72]

The search culminated in screen tests on 17 September for two candidates;[73] the author of the then new Penguin book *Understanding Science*, Alan Isaacs,[74] and Blin-Stoyle.[75] They were both asked to comment on a series of pictures produced by an artist who had taken LSD, to demonstrate a radar device for blind people, and to interview the University College London (UCL) physicist Peter Wilmore.[76] Blin-Stoyle was chosen to present a pilot programme in November 1963.

This pilot expressed the science-as-culture rubric in three magazine items, linked in *Monitor* style by Blin-Stoyle, including an insert film of Los Alamos scientist Professor Phillip Morrison interviewed at Cornell by Stephen Black on the moral responsibility of scientists,[77] a film profile made by Ramsay Short of the UCL biologist John Maynard Smith, and a studio item with insert films on the subject of aggression with the psychiatrist Anthony Storr.[78] These items exemplify several of the terms of the discussion up to this point. Short's film about Smith very definitely reproduces the 'thinks talk' model of the artist profile, as we hear Smith reflecting on his scientific practice whilst we see him classifying flies by examining them under a microscope. In the course of the item, we see him driving to work with his wife and daughter, discussing statistics along the way. In brief, it is a profile of what kind of person Maynard Smith was as a scientist, seen in his social environment.

We may note that at this stage, in September 1963, *Horizon* was not an absolute certainty; Daly mentioned to Blin-Stoyle, 'should we succeed, as I am confident we shall, in "selling" "Horizon" to my masters, there is a lot at stake for both you and me'.[79]

A crisis of definition: from pilot to first broadcast

Singer, as he was bound to, in November showed the pilot to Michael Peacock, chief of programmes, BBC2, with disastrous results. Singer confessed that Peacock 'was indeed as depressed about the programme as I was elated'. Peacock 'felt that the programme idea was too derivative, and that [they] were obsessed with the *Monitor* concept'; he suggested that the programme should have only two items, that it could be shorter than forty-five minutes and that they did not necessarily need an anchorman. Singer invited

72 Blin-Stoyle to Daly, 5 July 1963, T14/1,810/2.

73 John Newell to Gillian Gilman, 16 September 1963, T14/1,810/2.

74 Isaacs sent Daly some item ideas for the pilot on 17 July 1963; T14/1,810/2. He 'received his PhD from the Imperial College of Science and Technology, has conducted advanced research on rocket propulsion and has been a highly successful teacher of elementary science' – dust jacket biography.

75 Obituary, *The Independent*, 15 February 2007, accessed 8 February 2012.

76 John Newell to Alan Isaacs, 20 August 1963, T14/1,810/2. The LSD item was a rerun of John Freeman's role in 'Your mysterious brain'.

77 Reference in Leach to Singer, 8 July 1963, T14/2,195/1.

78 A filmed conversation between Fred Hoyle and Richard Feynman was not used; 'Recorded. Pilot programme: no transmission', no date marked, but 3 November 1963, T14/1,810. The programme was produced by Daly, associate produced by Ramsay Short and studio directed by Max Morgan-Witts.

79 Daly to Blin-Stoyle, 23 September 1963, T14/1,810/2.

his team to discuss alternative approaches and signed off his memo with the words 'I cannot emphasise the urgency of the situation'.[80]

In the six months from November 1963, Ramsay Short took a key role, working closely with Leach, and with Daly – otherwise occupied – at a distance.[81] As he noted in January, no one was working quite full-time on the programme at this point.[82] Daly was booked up until 2 March 1964;[83] he produced the televised version of a lecture by C.P. Snow, *The Two Cultures and the Sorcerer's Apprentice* (11 February 1964).[84] The virus programme *Smaller than Life?*, broadcast later in February, was produced by Daly, with a script by Taylor and insert films by Short.[85] A few days after Singer's memo on Peacock's reaction to the pilot programme, in preparation for a meeting on 26 November to discuss the issues, Short was reflecting on 'the anchorman problem'; he considered Blin-Stoyle to be a 'cold fish' as a presenter, and he proposed they do the first six issues without one. Blin-Stoyle was dropped. He added, 'We will be in the experimental stage anyway and I think we can evolve a style more quickly without the hazard of having to train a new man'.[86] We may assume that, for Short the documentary filmmaker, it was easier than for the others in the team to conceive of a programme without an on-screen mediator. The fact that he took little part in attempts to recruit anchormen implies that he intuitively looked to commentary rather than on-screen mediation to link and shape programmes.

In mid-December 1963, Singer agreed to present a new idea for the programme to Peacock in the first two weeks of 1964.[87] Accordingly, writing to Daly on New Year's Day 1964, Short stated that he would be 'talking to Gerald Leach about Horizon all Monday morning at his home and I have organised for him to be at our meeting all day Tuesday' (7 January). He stated,

> I am beginning to get a clear idea of how Horizon should shape and I am pretty confident that the single theme idea is the best. I agree that it will be difficult to produce a single theme 45 minute programme a month, but I think that we will have to evolve a style which will make this possible.[88]

The 'single theme idea' may be seen as a solution forced by the need to connect material without having an anchorman to make the links. It would be a halfway house between a diverse magazine and a true single-subject programme; similar ideas would be built into

80 Singer to Daly, 'Horizon', 22 November 1963, T14/3,316/1. Daly prompted Singer to arrange the viewing on 7 November; Daly to Singer, 7 November, T14/3,316/1.

81 We see this again in a letter Leach sent to Daly: 'Since you will be away for the next two weeks, I shall have to fix up what I am doing with Ramsay'; Leach to Daly, 18 February 1964, T14/1,809/1.

82 Short, 'Reason for calling the meeting', 7 January 1964, T14/3,316/1.

83 Short to Daly, 'Notes on Horizon meeting held 7th Jan 1964', 9 January 1964, T14/3,316/1.

84 In which Snow professed some surprise at the response to his Rede Lecture; *Radio Times*, 11 February 1964.

85 *Radio Times*, 25 February 1964, p. 31.

86 Ramsay Short, 'Horizon: thoughts from Ramsay (for tomorrow's meeting)', 25 November 1963, T14/3,316/1.

87 Singer to Daly, 'Horizon', 17 December 1963, T14/3,316/1.

88 Short to Daly, 1 January 1964, T14/3,316/1; Daly to A.H.Tel.Design, 21 February 1964, T14/3,316/1.

a single programme; the diversity would be less than in a magazine, but greater than in a programme on a single topic.

At this point the production team was expecting to record a second pilot on 15 March, with the first broadcast issue of the programme five or six weeks later. Short called the meeting on 7 January to discuss the programme, for which he did considerable preparation, and referred back to Daly's 5 March 1963 memorandum, 'the only written statement of a policy for Horizon'.[89] Agenda items included reviewing the statement; 'are we satisfied that we have clearly defined the style and form of the programme and its relationship to the audience?'. Other issues included how many scientific consultants they should have; the timing of getting their own film unit in the circumstances that there was too little filmmaking resource for all 'single-theme' programmes to be made that way (the evidence points to this being his preference); and the possibility of establishing the programme's identity not by having an anchorman, but by commissioning distinctive opening titles and music. In reviewing Daly's earlier policy in this document, he began to move away from the popular-science magazine approach: 'a "Scientific American" type programme would result in a series that was too didactic and too closely related to the "science only" audience'.[90] He approved the preference for reflecting current trends in scientific thinking over tying it to topicality. He agreed that 'it should be an ideas programme and should communicate to people in other fields; arts fields for instance'. He added that they 'should look backwards as well as forwards for our ideas'. He quoted Peter Medawar that 'science cannot be divided between what is up to date and what is merely of antiquarian interest, but is to be regarded as a growth of thought'. He had encountered this passage in researching the proposed programme on structure and form in the postscript that Medawar had provided to Ruth D'Arcy Thompson's biography of her father.[91] He proposed extending the programme beyond 'current trends' so as to create theme programmes, and he proposed ten possibilities, including Galileo, science and religion; amateur scientists; the conscience of the scientist; '3 biographies – contrasting types of disciplines'; Roger Bacon; growth and form; and technicians.[92]

The notes of the 7 January all-day meeting reveal that the team wanted to drop the second pilot and produce the first edition for 2 May, with the intention of having two or three items scripted in detail and partially shot well in advance. They asked for staffing to be increased. They agreed to rewrite the policy document. Gerald Leach – present at the meeting – was asked to work two days per week as the main writer for the programme; John Maddox would advise on work in the universities. The production team expected to have a film unit from February, and that an OB unit would be available for the first three programmes. They confirmed that it would not be essential to have an anchorman, though they continued to look for one; the philosophers Bernard Williams and Peter Alexander were mentioned. Short undertook to investigate composers for title and

89 Short, 'Reason for calling the meeting', 7 January 1964, T14/3,316/1.

90 Short, 'Reason for calling the meeting', 7 January 1964, T14/3,316/1.

91 Ruth D'Arcy Thompson, *D'Arcy Wentworth Thompson, The Scholar-Naturalist, 1860–1948*, London: Oxford University Press, 1958, p. 232.

92 Short, 'Reason for calling the meeting', 7 January 1964, T14/3,316/1, original emphasis.

incidental music. They discussed the single-theme idea 'at some length', on the basis that it meant 'unity rather than theme', which would allow them to put several items together. In sum, as Short's notes comment, 'a great deal of time was spent on discussing the aims (philosophy) of Horizon'.[93]

Daly, very busy with producing the C.P. Snow and *Smaller than Life* programmes, drew assistance from Leach to redraft his March 1963 policy statement in preparation for the meeting with Peacock. Leach's version reintroduced the term 'culture', but – most likely with respect to Peacock's scorn about their fixation – dropped the explicit references to *Monitor*, retaining an unspecific comparison: 'Horizon will attempt to present science as a culture – as a field of human achievement and endeavour as lively, varied and as rewarding as any other'.[94] He was keen to assert the novelty of the proposal, and in what it lay:

> This has never been done before in a comparable medium. Apart from books, science is nearly always presented as a set of impersonal facts and discoveries and what we can do with them, almost as if they were produced by magic out of a vacuum. There is rarely any recognition of the vital fact that any scientific discovery or idea is a personal creation, stamped by the character of the scientist and his age; that they are as different in kind as (say) a play by Brecht and one by Ionesco; that there are fashions in science and that fashions change for the same extraordinary reasons as anywhere else … In short there is rarely any attempt to place new developments in science in their total context – personal, social, historical, political.[95]

In closing, he once again asserted the relationship between the scientific culture and others: 'All other cultures are discussed in this way – it is what makes them interesting and lively and controversial. There is no reason why science should not be too.'[96] Here, perhaps, we see the sole influence of C.P. Snow's Rede Lectures – which were at no stage explicitly discussed – in the sense that Daly is not alluding to one culture in the cultural-studies sense, in which science might be a component of a greater whole, but to science having its own culture with which others might be compared, allied with a whiff of petulance that science was not receiving its due.

A brief anonymous statement from around this time, 'Notes on Horizon Policy', seems to be the work of Ramsay Short; it combines some of the phrases from Leach's document with the passage from Medawar.[97] This document may be seen as the confluence of Leach's and Short's thinking on the programme, as part of a developing temporary consensus across the team.

Daly's memorandum for the meeting with Peacock not only followed Leach in dropping all references to *Monitor*, but directly took up some of this wording. He aligned Leach's point about not simply presenting science 'as a set of impersonal facts and discoveries' with the approach of existing science programming on BBC1: 'generally speaking, science programmes on Channel I deal with small areas of science which are

93 Short to Daly, 'Notes on Horizon meeting held 7th Jan 1964', 9 January 1964, T14/3,316/1.

94 Leach, 'Notes on "Horizon" policy', attached to Leach to Daly, 9 January 1964, T14/2,195/1, original emphasis.

95 Leach, op. cit. (94).

96 Leach, op. cit. (94).

97 Anon. [Ramsay Short?], 'Notes on Horizon Policy', undated, *c.* January 1964, T14/3,316/1.

visually exciting … these programmes have tended to concentrate on new discoveries. [He would have been thinking about *Eye on Research* or *Challenge*.] The approach has of necessity been piecemeal'. He recast and weakened Leach's stress on 'science *as a culture*' to science *affecting* culture: 'If science is to have a real effect on human thought and culture, discoveries have to be understood'. Rephrasing the quotation from Medawar so as to stress the novelty of this offer for BBC2, he stated, 'what is lacking and what we now plan to do in HORIZON on Channel II is to present science as a continuous growth of thought, an endless adventure of the human mind'.[98] Reordering Leach's draft again, and for the first time (for him) including the social account, he continued,

> this implies that we recognise the scientist as a member of society and see his ideas and discoveries as personal creations stamped by the character of the man and the society in which he lives. The policy of HORIZON, therefore, will be to present science as a field of continuing human endeavour and achievement, as lively, varied and rewarding as any other, and to place new developments in science in their total context – personal, social, historical, political.[99]

He went on to emphasize the virtues of the single-theme approach, here initially ascribed to Peacock: 'We accept the point that each edition should be built from items centred on a general theme. This will certainly produce a more viewable programme though probably a more expensive one.'[100] We can see how this was expected to work from some of the example programmes he listed. Daly's candidate for the first programme was to use the quatercentenary of Galileo's birth as a hook for pieces on science and conscience. He expected the second programme, on structure and function, to be made as a second pilot, then transmitted.[101] Daly listed a programme featuring a conversation between W.H. Auden and Konrad Lorenz, even though it had been rejected by Singer ('No. Too airy-fairy'[102]). Other programme possibilities included 'Lies, damned lies and statistics', and a possible Hoyle programme on the unified field theory: 'our approach might be a brief assessment of the significance of the Theory – three lines of elegant mathematical equations – followed by a profile of Hoyle and his pupil [Dr J.V. Narlikar] and the importance of the partnership that has developed between them'.[103] In these examples, we see, shining through, the focus on scientific ideas rather than science news, and on scientists as people, evident from the time of Leach's first memo. For him, the problem of the anchorman was unsolved. 'Now that we have agreed to build each programme round a single theme, the argument for a regular anchorman is

98 The distinction between the BBC1 and BBC2 approaches to science adopted by Daly here is outlined in Leach's covering letter, Leach to Daly, 9 January 1964, T14/2,195/1.

99 Daly to Singer, 'Horizon proposal', 23 January 1964, T14/3,316/1.

100 The original version on 23 January, before corrections from Singer, read, 'We accept Ch P BBC-2's point that each edition should be built round a single theme'. Daly to Singer, 'Horizon proposal', 23 January 1964, T14/3,316/1.

101 'Horizon proposal', 4 February 1964, T14/3,316/1.

102 'Horizon proposal' (draft), 23 January 1964, T14/3,316/1. The handwriting is proved to be Singer's by the memo Daly to Singer/Singer to Daly, '"Horizon" Press Release', 24 April 1964, T14/1,610/1.

103 Daly to Singer, 'Horizon proposal', 23 January 1964, T14/3,316/1.

greatly weakened'. Sometimes – as in discussions – none would be needed; sometimes a contributing scientist could take on the role. But there is an air of reluctance here, and he mentions that he had encouraged the 'non-scientist' philosopher Bernard Williams to host three or four programmes per year. The memo suggests that for the first six to twelve months Daly would act as editor, that Short would be associate producer and that they might call in Robert Reid, a producer who specialized in television films, to produce particular editions.[104]

The producer John Dutot did significant preparation on the Galileo programme, including discussions with Michael Hoskin, historian of science in Cambridge, who had broadcast a talk on Galileo on the Third Programme on 21 January 1964. Singer passed on from David Martin at the Royal Society the information that they had invited Giorgio De Santillana, author of the *Crime of Galileo*, the 1955 McCarthyite reading of the story, to give a lecture for the quatercentenary.[105] Various items were under discussion at this point, including an Arthur Koestler Galileo item, an acted sequence from the 'Dialogues concerning Two New Sciences', a conversation between Richard Feynman and Fred Hoyle about the latter's continuous-creation theory (filmed for, and not used in, the pilot), the Stephen Black interview with Philip Morrison about the scientist's conscience from the pilot programme, and A.V. Hill on the ethical dilemma of the scientist today.[106] But on 17 March Daly mentioned in a letter to Leach that

> we have decided to drop the Galileo programme – for the moment at any rate – partly because we think it wrong to start with a retrospective programme and partly that we are not sufficiently confident in it as a curtain-raiser … Instead we propose starting with 'Structure and Function', which Ramsay has shot, with Buckminster Fuller.[107]

By June, it seems, the Galileo programme had been dropped altogether.[108]

Following a suggestion from Peacock in mid-March, a programme on pesticides was briefly considered for the first broadcast because a government report on the topic was imminent. It was at this point that the programme on structure and function became the chosen first programme to launch the series on 2 May 1964, with Daly steadfastly following the principle of avoiding topicality: 'It is important that we launch *Horizon* with a new approach to science on television, and this Buckminster Fuller does admirably'.[109] We may note that the structure and function programme had, by, this date changed its emphasis to focus on Fuller.

In mid-March Singer asked Daly to write a press release on the programme for use in April, which eventually appeared in the *Radio Times* to introduce the series. Starting with a reference to Robert Oppenheimer's reflections on the basis of science in common sense, Daly proceeded to stress elite scientists and, interestingly, philosophers: 'The aim

104 Daly to Singer, 'Horizon proposal', 23 January 1964, T14/3,316/1. There is no explicit record of the meeting with Peacock, though we must assume that this new version of the programme gained assent from him.

105 Singer to Daly, 25 February 1964; John Dutot, 'Galileo', 18 March 1964, T14/1,809/1.

106 Daly to Singer, 'Horizon proposal', 23 January and 4 February 1964, T14/3,316/1.

107 Daly to Leach, 17 March 1964, T14/2,195/1.

108 Hoskin to Daly, 29 June 1964, T14/1,809/1, the file for the aborted programme.

109 Singer to Daly, 17 March; Daly to Singer, 20 March 1964, T14/3,316/1.

of *Horizon* is to provide a platform from which some of the world's greatest scientists and philosophers can communicate their curiosity, observations, and reflections, and infuse into our common knowledge their changing views of the universe.'[110] He then presented the by-now familiar formula:

> we shall do this not by presenting science as a series of isolated discoveries but as a continuing growth of thought, a philosophy which is an essential part of our twentieth-century culture. *Horizon* will not be didactic, though where necessary the background to a subject will be sketched in and the basic facts explained.

He presented to viewers the structural solution the team had developed in the preceding six months: 'there will be no regular anchor-man, and each programme will revolve around one central theme. We shall not attempt exhaustive documentaries, but focus on two or three aspects and deal with them at length'. Rather thrillingly, he suggested that 'occasionally we shall invite scientists to argue over some of their disagreements'.[111]

Watching *Horizon*, seeing science

Focusing on a sample of *Horizon* programmes from 1964 can reveal what account of science the programmes presented once planning turned to implementation. At the same time it should not be assumed that these programmes constitute a planned sequence, as the archive reveals constant flux in the development of programme ideas, and frequent cancellations.[112] All the main protagonists had a direct hand in production duties, though Singer, as head of department, acted at a distance, and Daly bowed out of his editing role in the programme's second month.

'The world of Buckminster Fuller' (2 May 1964) deserves special attention as the direct outcome of all the debates of the preceding eighteen months. It was produced by Ramsay Short on film,[113] and had no anchorman, using the narrator Gordon Davies instead.[114] The choice of subject for this programme dates back to the definitional memorandum written by Leach, who also – in his role as *Horizon* programme writer – advised closely on the programme.[115] For most of its development, as we have seen, it had carried the working title 'Structure and form'. Short, after a flurry of activity on the programme in November 1963, commissioned the science writer Lancelot Law Whyte to undertake a feasibility study, after meeting him for a discussion, and reading some of his articles in that month.[116] In late January, the programme was explicitly framed by C.H. Waddington's view that the science of biology had its origin in the study of

110 Anon. [Daly], *Radio Times*, 30 April 1964.

111 Anon., op. cit. (110).

112 See throughout file T14/3,316/1.

113 An 8 April studio booking was cancelled by Short on 19 March; Short to Daly, 16 March 1964, T14/3,316/1.

114 'Final estimated of Television Outside Broadcast', T14/1610/2.

115 Including a discussion at home on 12 February and several phone calls; G. Leach Productions to Daly, Invoice, 1 March 1964, T14/1610/2.

116 Short to Whyte, 22 November 1963; Short to Daly, 'Horizon project: Growth and Form', 9 January 1964; 'Final estimated of Television Outside Broadcast', T14/1610/2.

structure and was to feature Buckminster Fuller and Aaron Klug, illuminating the similarities between Fuller's domes and the structure of viruses.[117] Short also wrote to Peter Medawar about the programme a week later, saying that it was to be based on D'Arcy Thompson's *Growth and Form*, and alluding to Medawar's postscript to Thompson's daughter's biography.[118] J.D. Bernal was also paid a fee for advice on the project in mid-February.[119] At this point, the programme was still very broad in its ambitions, and intended to reference 'the stupendous diversity of natural forms and structures', eighteenth- and nineteenth-century natural philosophy, and Kepler's cosmology, as well as Fuller and Klug.[120] The filming took place in the last week of February and the first week of March.[121]

The programme featured the distinctive titles and music that the team had planned (a mirror-distorted series of shots of a graphic of Fuller and his domes accompanied by a jazzy pop theme tune featuring harpsichord, composed by James Stevens[122]). The programme's prelude features Buckminster Fuller speaking to camera in front of the geodesic radomes at RAF Fylingdales. The commentator introduces him as a figure spanning science and art, and proceeds to establish the personality of the series, quoting the terms of the internal debate: '*Horizon* aims to present science as an essential part of our twentieth-century culture, a continuing growth of thought that cannot be subdivided. So tonight in this, our first monthly programme, we explore this undivided, all-embracing world of Buckminster Fuller'. This voice-over accompanies shots of Fuller examining molecular models at the Laboratory of Molecular Biology in Cambridge, a sequence which is followed by an interview with Aaron Klug in the same location on the inspiration of Fuller's work for his own work on viral structure. This leads to a filmed lecture by Fuller to students at the Architectural Association, explaining his structural ideas. A sequence on the history of the five regular Platonic solids follows, featuring Plato and Kepler, leading into a history of some of Fuller's early architectural ideas. The programme then covers Fuller's interests in 'explorers in science and architecture' – Einstein and Lloyd Wright – and treats his Dymaxion road vehicle. A longer sequence looks at his domes in principle and practice. The programme returns to a discussion between Klug and Fuller on the similarity between the domes and viral structures, and with the electron microscopist Robert Horne of the Agricultural Research Council on the structure of enzymes. Fuller gives examples of the many geodesic structures in nature. The programme closes with film of a helicopter carrying a geodesic dome.

The film may be seen as themed in the sense that the figure of Fuller unites a series of segments concerned with structure and form. But Fuller is so dominant within the programme that it is closer to being on him as the sole subject. In terms of the preceding discussions, it may be seen in particular as exemplifying the view that 'any scientific

117 'Horizon proposal', 23 January 1964, T14/3,316/1.

118 Short to Medawar, 31 January 1964, T14/1,610/2.

119 Fee slip, 13 February 1964, T14/1610/2.

120 Short, 'Outline for "Horizon" programme on "Structure and Form"', 19 February 1964, T14/1610/2.

121 'Schedule, "Structure and Form" 72/64/4007', 20 February 1964, T14/1610/2.

122 Played here by Brian Diamond and the Cutters, and later by Les structures sonores, François and Bernard Baschet on their musical sculptures.

discovery or idea is a personal creation, stamped by the character of the scientist and his age'.[123] The programme deliberately blurred science and art, which also moved it closer in subject to *Monitor*. It is worth noting that Short's training in architecture here enabled an account of science that was congruent with his January intervention that the programme 'should be an ideas programme and should communicate to people in other fields; arts fields for instance'. Short enjoyed the category confusion that the subject created; he wrote to Fuller after the broadcast: 'your programme was thought to be very off-beat by the science boffins in my Department [presumably Daly and Taylor], and they were surprised and delighted by its success';

> I think it will amuse you to know that the arts programme 'Monitor' were thinking of doing a programme about you; they had you labelled as 'art' and were a bit surprised to find you 'coming out as science'. Just the kind of confusion I love to spread![124]

Peacock's suggestion for a programme on pesticides became the second programme, 'Pesticides and posterity' (30 May 1964, 'associate produced' by Short, who directed all the film sequences,[125] with Gerald Leach advising). Here the opening titles, using the same technique, include distorted images of a crop-spraying biplane and locusts. The introduction to the programme is about insects, with commentary spoken by John Anthony, using footage from Bert Haanstra's 1955 film *The Rival World* (made for Shell) and others, establishing the importance of pesticides and the associated issues.[126] The programme proceeds with two short films giving post-*Silent Spring* opposing views of industrial chemicals. In the first, we see the ecologist Frank Fraser Darling, driving from his eighteenth-century village house into the Berkshire countryside, then walking, and we hear his 'thinks talk' about ecology, agricultural chemicals and Rachel Carson. After five minutes he speaks to camera about the interconnectedness of living things. His voice-over resumes, critical of the intensification of agriculture, extolling the benefits of wilderness and peace. This is contrasted with a filmed interview with Dr Eric Edson, director of Fison's Chesterford Park Research Station – a location that is not revealed in the programme, but listed in the *Radio Times*. We see him at his desk, making the argument that 'it's very difficult to persuade people that the people who make and use these poisons aren't wilful poisoners. They are careful, conscientious, selective poisoners in the service of mankind'. We then see him at the Fison's plant, explaining his background as 'a medical man' working long-term on toxicity. As with Darling, we see him drive up to the research station (a country house), as we hear him talking about the care the industry takes. To camera he reads a statement about the processes that industrial chemists go through in developing chemicals; this continues as voice-over as we see him overseeing a field trial and a technician in the laboratory, and walking through the building and greenhouses. We see him explaining and going through files of the results of extended tests. As the film's conclusion, he stresses his personal commitment to the safety of human consumers. This person-centred approach to the

123 Leach, 'Notes on "Horizon" policy'.
124 Short to Fuller, 8 June 1964, T14/1,610/2.
125 'Week 23: Promotional Material: Horizon: Saturday, 30th May', 7 May 1964, T14/1610/3.
126 See T14/1610/3.

subject was suggested by Leach in a letter to Short at the beginning of April; in this, we see the general philosophical discussions about approach being converted into actual programmes:

> I think we may have to go strongly for personalities and take, say, Rothschild or Edson of Fisons and set him up in his background of the chemical plant, research labs, research in progress etc talking about his own general feelings on this subject – ie. mastering the environment through pesticides and look after the side effects as best you can – and then compare with a similar sequence on say Moore of the Nature Conservancy at their Monk's Wood station, also showing background and works in progress, while he talks from a more cautious, ecological viewpoint.[127]

These two substantial film segments were followed by a studio discussion on the issues (recorded onto tape the day before broadcast[128]), linked by John Anthony (as an out-of-vision anchorman), between Lord Rothschild ('FRS, director of research of a large chemical company'[129]), Robert Boote (of the Nature Conservancy) and John Maynard Smith. Leach stressed his view of the purpose of the discussion: to give 'time for Boote to criticise Edson, and equally for Rothschild to go at Darling'.[130] Here we see fulfilled the promise of Daly to have invited scientists arguing over some of their disagreements.

'Strangeness minus three' (25 July 1964) was produced in the United States by Daly, with some guidance by the science writer Tom Margerison. Leach, who had done some preparatory work on the subject, had felt that it wasn't suited to television presentation; as he stood down on the project, Daly took it on because, as he said, 'I regard it as a challenge because if HORIZON cannot tackle it, then no other programme can'.[131] It is bookended by sequences of Richard Feynmann speaking; and long interviews with the physicists Murray Gell-Mann, Yuval Ne'eman (both interviewed by David Lutyens) and Nicholas Samios, talking about the discovery of what was then known as the Omega-minus particle.[132] In televisual terms, the programme is much plainer than Short's more highly wrought film documentaries. It makes few concessions to the general viewer except for the informality with which the interviewees speak to camera; they often fall back on the didacticism of using blackboards and chalk to explain the physics under discussion; short film sequences of the proton collider at Brookhaven relieve the eye of the overwhelming visual content of the programme: clever scientists talking. Daly explained the appeal of the project to him in a memo to the *Radio Times*: 'Samios, Gell-Mann and Ne'eman tell their own personal stories. The philosophical implications are explained by Richard Feynmann, one of the world's leading theoretical physicists, and probably the most brilliant and entertaining scientific expositor alive today'.[133] Feynmann spends eight minutes in the final sequence talking about the significance of

127 Leach to Short, 4 April1964, T14/1610/3.

128 Daly to Boote, 7 May 1964, T14/1610/3.

129 Description in *Radio Times*, 30 May 1964, p. 13. The Company was Royal Dutch-Shell; Jon Agar, 'Thatcher, Scientist', *Notes & Records of the Royal Society* (2011) 65, pp. 215–232.

130 Leach to Daly, 22 April 1964, T14/1610/3.

131 Daly to Leach, 17 March 1964, T14/2,195/1.

132 A 1966 repeat of the programme was available on YouTube at the time of writing, at www.youtube.com/watch?v=y3Vc-cL9lTM, viewed 3 January 2014.

133 Daly to editor, *Radio Times*, 6 July 1964, T14/1610/7.

Omega-minus. This talk, delivered informally and with commitment, amounts to a credo, stating his conviction that the time was ripe for a breakthrough in subatomic physics; he draws an analogy with the suggestiveness of Mendeleev's periodic table – that it required the insights of twentieth-century physics to explain the similarities of sodium and potassium. For him, to understand the implications of the new discovery would require a comparable 'deep and profound transformation of ideas somewhere along the line … The great discovery always involves a great philosophical surprise'. He then turns to physicists' motivation for this kind of work:

> It's lots of work. So why do we do it? Because of the excitement, because each time we get one of these things we have a terrific El Dorado … a wonderful new view of nature. It takes a terrible strain on the mind to understand these things. And the real value of the development of science in this connection … is the difficulty of understanding it … We live in a heroic age … these discoveries cannot be made twice … We now know enough … When we do finally find the answer … we'll look back and we'll see how a perfectly sensible logical line of reasoning from the present position could have brought us to the understanding. I wouldn't have said that before the discovery of the Omega-minus. That, to me, is the significance of this discovery.

This 'philosophy' – essentially a scientist known for his communication skills enthusing about his field – may well have been the kind of 'philosophy' that Daly had always had in mind when he was composing the definitional memoranda for *Horizon* in the eighteen months leading up to its launch. What it achieves in terms of the intended ethos of the series is to break several of their rules – it is very didactic, for example – in the service of revealing what kinds of people scientists are, and what motivates them.

Ramsay Short's 'The amateur scientist' (19 October 1964), another surviving theme from Leach's first list, was a cinematically workmanlike thematic film that posed the questions 'is there a place in the complex modern world of science for the amateur? Or is science now too involved, too costly, for amateurs to pursue?'[134] It bookended its answer using an interview with C.L. Stong, author of the popular *Scientific American* column that shared the programme's title. The subjects of the programme's main sections were John Bunyan, an amateur microscopist; Frank Hyde, who had converted a Martello Tower at Clacton into a radio astronomy observatory; the Rev. Dr Cameron Dinwoodie, a Church of Scotland minister and amateur computational astronomer; and Bernard Campbell, a doctoral graduate in anthropology but by profession a farmer, conducting a parallel existence as a physical anthropologist measuring skulls. Stong's concluding piece to camera may be taken as the programme's view: in the past all science was amateur, and amateurs do valuable observational work in the present – the move to shorter wavelengths in radio, the observation of variable stars and climate observations. But, he concludes, 'amateur means "for the love of" and those who pursue science in the amateur sense follow their avocation because they enjoy it. It adds to the appreciation of the universe during their short span in it'.[135]

134 Programme as broadcast script. The BFI National Archive holds a mute 16 mm print of the programme; I have been unable to find a married print.

135 Programme as Broadcast Transcript.

'Science, toys and magic' (14 December 1964, produced by Ramsay Short) is a playful live Christmas entertainment from the studio, a single-theme programme bringing together the antique toys and scientific demonstrations of its title performed respectively by John van Riemsdijk of the Science Museum and Bill Coates of the Royal Institution, and various interpretations of levitation, starting with the 'Asrah the Floating Princess' stage illusion performed by the conjuror Robert Harbin. Next, Professor Eric Mendoza, then researching low-temperature physics at Manchester University, demonstrates the magnetic flux provided by a superconducting freezing device. Mendoza is then himself levitated by Harbin. In the ensuing sequence, Professor Nicholas Kurti displays the magnetic behaviour of supercooled oxygen, and Professor Eric Laithwaite of Imperial College demonstrates various kinds of magnetic levitation. The final interviewee is Dr E.J. Dingwall (an expert in psychical phenomena), who gives an account of nineteenth-century and older examples of human levitation by will. Finally the programme cuts to Harbin levitating a television monitor showing Dingwall in mid-explanation.

Of the other 1964 programmes, 'A candle to nature' (27 June 1964, produced and directed in the studio by John Dutot) comprised a performance of Faraday's 'Lecture on a Candle' followed by George Porter presenting an updated version. Originally intended as a Christmas programme, it was brought forward to June after the cancellation of a programme on mathematical concepts.[136] 'The air of science' (22 August 1964, produced on film by Ramsay Short) comprised a visit to the Medical Research Council laboratory headquarters at Mill Hill, featuring Peter Medawar.[137] This was the first programme to list Taylor as editor, rather than Daly, although it was very much Short's film. 'The knowledge explosion' (21 September 1964, produced by Michael Latham[138]) was a thematic programme made on film but stylistically plain, clearly the work of a television producer rather than a filmmaker. It compared Nigel Balchin presenting an autobiographical essay on how technology had changed since his birth in 1908, via a sequence on the General Motors 'Futurama' exhibit at the 1964 New York World's Fair, with a sequence of Arthur C. Clarke predicting the future, and Derek de Solla Price reprising his thesis on the doubling period for scientists from his *Little Science, Big Science* (published the year before). In many ways, this is the perfect example of the team's idea of a themed programme, pulling together four items under one heading. 'Tots and quots and woodgerie' (16 November 1964, produced by Michael Latham) makes the argument that the close connections between scientists and government were anticipated by Solly Zuckerman's dining club and the circle around Joseph Henry Woodger. 'Professor J.B.S. Haldane, obituary' (1 December 1964, produced by Jill Wood and Daly) was, remarkably, broadcast on the day of Haldane's death as a special edition of the programme, fulfilling an ambition to be able to stockpile footage for later use. It included Haldane himself delivering his own obituary filmed in

136 Alan Sleath to Singer, 23 October 1963; B. Bayle to Sylvia Hewitt, 10 June 1964, T14/1610/5.

137 T14/1,610/8 and /9.

138 Obituary: anon., 'Michael Latham – Telegraph', *Daily Telegraph*, 4 June 2006, www.telegraph.co.uk/news/obituaries/1506899/Michael-Latham.html, accessed 29 December 2013.

February 1964;[139] a five-minute live appreciation by his pupil and friend, John Maynard Smith; and some archive film.[140]

In sum, these first ten programmes very strongly embody the influence of Ramsay Short, more clearly than any other team member, reflecting not only his 'associate producer' role, but also the effectiveness of his programmes, whether – like 'Buckminster Fuller' – made as films, or whether in the studio – as in the case of the Christmas programme. All can be seen as exemplifying, in different ways, the intended stress on ideas and on scientists as people. The ideal that *Horizon* should be a programme organized around linked themes can be seen in most cases, although in 'The world of Buckminster Fuller', for example, it might be seen as a programme as much on Fuller as on structure and form. And, because none of these 1964 programmes was a diverse magazine programme on the model of *Monitor*, an anchorman was rarely deemed necessary. Of the 1964 issues, only the 'Tots and quots' programme really used one (John Napier).

Gordon Rattray Taylor as editor

After Gordon Rattray Taylor became editor from 16 June 1964, taking responsibility from the 22 August issue ('The air of science') onwards,[141] the programme slowly began to show his influence. There is also a significant element here of Taylor being obliged to respond to pressure from Singer and others in the BBC hierarchy who themselves were adjusting BBC2 in a troubled first year. For example, it had proved necessary to abandon Peacock's chosen 'seven faces' weekly programme structure, designed to complement BBC1, within just a few months.[142] Four factors are relevant here: the production team, programme definition, programme frequency and pressure to implement the magazine format. One of Taylor's first moves was to reshape the *Horizon* team: he quickly moved to reduce the influence of other science writers, on the grounds that those were his particular skills. He terminated Leach's contract in July, along with those of Daly's other two advisers, John Maddox and – after a contractual delay – Stephen Black.[143] At the same time he was complaining about how under-resourced the team was: 'what we are doing is to create two understaffed production teams out of one well-staffed one. This is a somewhat desperate measure designed to retrieve the situation, but leaving us exposed until it is corrected'.[144] Pressure on the team was relieved by the arrival of the producer Jill Wood from late October.[145]

139 Joan Scott to Television Accounts, 4 March 1964, T14/1,610/12.

140 Audrey Hadfield to John Moore, 2 December 1964, 'Final estimate of television outside broadcast', 1 December 1964, Joan Scott to Television Accounts, 4 March 1964, T14/1,610/12.

141 Taylor to Leach, 25 June 1964, T14/2,195/1.

142 Briggs, op. cit. (16), p. 412.

143 Chief Science Assistant to AH Cop, 10 July 1964, T14/3,316. Both were subsequently employed by the department. Leach, who had found his status as a freelancer – neither insider nor outsider – difficult may have experienced some relief at this termination; see e.g. Leach to Daly, 22 January; Daly to Leach, 29 January 1964, T14/2,195/1.

144 Taylor to Singer, 'Horizon Specials', 24 June 1964, T14/3,316/1.

145 Latham to Taylor, 29 October 1964, T14/3,316/1.

As editor, Taylor for the first time composed a statement on *Horizon* style and content (the archive contains no previous interventions from him in the debate). As he mentioned in an aside, 'I am anxious to give the programme a more clearly defining character than hitherto'.[146] In the final version of this document (there were three drafts) he wrote an account of the programme that contained many familiar tropes. He came down on the Daly side of the argument in stressing ideas rather than Leach's and Short's preference for emphasizing the culture of science, but with a new focus on the audience:

> 1. Each HORIZON programme should present the viewer with a definite thought or proposition and should provoke viewers to continue discussing this proposition after the programme is over … It is in this sense that we should interpret the brief that HORIZON is to be 'a programme of ideas'.[147]

He continued in playing down topicality and didacticism:

> 2. HORIZON is not a news magazine. If it is any kind of a magazine it is ENCOUNTER rather than LIFE or NEWSWEEK. It will not report specific researches and discoveries so much as contemporary trends and issues in science. It will aim to leave the viewer better oriented rather than merely better informed. Though a topical element will be important, relevance, rather than topicality, will be the keyword. 3. HORIZON is not a didactic programme and will always avoid adopting a didactic stance. In effect it will say 'It's rather interesting that …' rather than 'Tonight we are going to tell you about …'. It will buttonhole rather than lecture.[148]

Here the emphasis on scientists as people is explicitly diverted to the elite, reintroducing the *Monitor* comparison:

> 4. While HORIZON will naturally exploit the appeal of strong personalities, it will not present personalities merely because they are good speakers or have something amusing or intriguing to say. It will concentrate on those people who have played or are playing a major influential role in science and about whom a well-informed person should therefore have some impression – much as MONITOR might do an essay on Braque or introduce the Whitechapel group of painters … the guiding purpose must be that HORIZON should not present a personality for its own sake, but because it leads to the discussion of an idea, in the sense defined in the first paragraph.[149]

Taylor, perhaps reflecting the difficulties of getting the programme established, had a strong commitment to developing a clear editorial personality for the programme:

> 5. HORIZON has an identity, and brings up subjects because it believes they are interesting and relevant; it does not do programmes merely because they are socially important or haven't been covered elsewhere. Viewers must come to trust HORIZON's judgement, just as they trust the editor of their preferred paper to select what interests the particular readership.[150]

146 Taylor to Leach, 25 June 1964, T14/2,195/1.

147 Taylor, 'Horizon: a note on style and content', 24 June 1964, T14/3,316/1. He had stressed this new intention in a memo to the whole team the day before. Taylor to Latham, Short, Dutot, Cordingley and Cantor, 'Horizon', 23 July 1964.

148 Taylor, op. cit. (147).

149 Taylor, op. cit. (147), original emphasis.

150 Taylor, op. cit. (147).

Taylor was under pressure from above over the programme style; Singer conveyed the tone of a discussion with Peacock,

> who made the point, which I think is a valid one, that it is not sufficient to present the problem to the viewer – there must be direct communication. In plain words he felt our ideas were rather philosophical and were perhaps adding to our production difficulties and he hoped from time to time we could deal with a hard point. Nevertheless he is very pleased with the way 'Horizon' is developing.[151]

There was evidently significant uncertainty about the chosen style, as in October Taylor was passing on guidance that 'we have been asked to relate "Horizon" more closely to the news in future', breaking one of the fundamental principles that had been in place for nearly two years at this point. Taylor's compromise was to propose subjects – four out of six already under discussion – that could be linked to the news, thus seeking to hold the line for 'relevance rather than topicality'.[152] So it was that the press release version of his policy memo written at this time expressed the original concerns with ideas and with scientists as people:

> The *Horizon* series is a programme about ideas, trends and issues in the field of science – and of course about people. Rather as *Monitor* does for the Arts on Channel I, it tries to give the ordinary man, who is not particularly science-minded, but wishes to be intelligently aware of what is going on, a sense of being in touch with all that is really important. What kind of world is the world of science? What do scientists talk about?[153]

Softening the stand against topicality, he asserted,

> Normally, it will not report research as such – there are other series which do this. However, when a scientific discovery of really major significance is made – something which puts the scientists themselves in a 'tizzy', *Horizon* will report on it.[154]

Reflecting the internal document's stress on making a proposition to the viewer, he concluded,

> Incidentally, 'Horizon' is not an educational programme, though I hope it will often be educative! 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, represents the sort of discussion we aim at.[155]

There were also some concerns within the BBC about the programme's quality, as opposed to style. Latham wrote that the programme review board felt that 'Horizon was "alright" but "rather amateurish" … I think that, internal politics apart, this particular criticism is valid (I exclude Ramsay's films from this)'.[156] Taylor wrote to the team in mid-November that 'some slight changes in the conception of *Horizon* will be necessary

151 Singer to Taylor, 2 September 1964, T14/3,316/1.

152 Taylor to Horizon team, 13 October 1964, T14/3,316/1.

153 Taylor, 'Science for all' (press release), 17 November 1964, T14/3,316/1. Written in October (it refers to 'The amateur scientist' on 19 October as the latest issue) and submitted for publication on 3 November; Taylor to Geoffrey Howard, T14/3,316/1.

154 Taylor, op. cit. (153).

155 Taylor, op. cit. (153).

156 Latham to Taylor, 29 October 1964, T14/3,316/1.

and *in any case we have not yet achieved any uniformity of style*'.[157] He proposed a regular monthly producers' meeting to address this. The fact that the form was contested is clear from Short's note agreeing to attend: 'I suppose I have attended 10–15 meetings on *Horizon* in the last year in which the subject of style has always been discussed, and always abortively'.[158] This not only shows that the failure to establish a consistent style was a continuing issue for the team, but also betrays tension between Taylor and Short, which may well have contributed to the latter's comparatively early exit from the team in 1965.[159] It may be that Short, given the significant role that he had played since Peacock's rejection of the pilot programme, resented Taylor's appointment as programme editor and the potential diminution of his 'associate producer' role, not to mention the dismissal of his ally, Leach.[160]

The third significant factor was the decision to double the frequency of the programme to fortnightly from the 6 January 1965 issue, in a programme of forty minutes' duration.[161] Singer had written to Taylor in September to communicate Peacock's assent to the idea, on which Singer commented, 'as you know I have always been convinced that we should go fortnightly'.[162] The more active members of the team were feeling the pressure already when the doubling was announced: Latham and Short wrote to Singer that they felt the team to be rather inexperienced:

> Gordon Taylor is an experienced television writer, but has no experience of series editing; Ramsay Short is capable with film, but has neither studio nor OB background; John Dutot is rusty on film …; Peter Cantor has little experience as a P.A. [production assistant]; David Cordingley likewise; after some years on 50–60 minute features I [Latham] am not yet properly geared to the faster turnover.[163]

The fourth, and perhaps most significant, factor in Taylor's editorship was the desire to achieve the magazine-programme format. As Singer argued, the fortnightly rate would require

> a change in the format and emphasis of 'Horizon'. We cannot afford the luxury of preparing a complete documentary programme for every edition … [it] will have to move more closely towards the magazine format and should consist of two or three items … sometimes – but not necessarily – grouped around a unified theme.

He added a significant observation:

> It is apparent that 'Horizon' has not yet formed a coherent team. This is partially due to the fact that that each producer regards himself as being responsible for a complete edition … in future the first few editions of 'Horizon' should be a team responsibility, not the responsibility of single producers.[164]

157 Taylor to Horizon Team, 18 November 1964, T14/3,316/1, my emphasis.
158 Short to Taylor, 19 November, T14/3,316/1.
159 Boon, op. cit. (32), p. 491.
160 Singer, Ramsay Short Annual Confidential Report, 8 September 1964, L1/2,024/1. This judgement may reflect the precise timing, coming just three months after Taylor's appointment as editor.
161 They argued up from thirty minutes. See CA OBFS Tel to Peacock, 2 October 1964, T14/3,316/1.
162 Singer to Taylor, 2 September 1964, T14/3,316/1.
163 Latham and Short to Singer (cc Taylor), 30 September 1964, T14/3,316/1.
164 Singer to Taylor, 25 November 1964, T14/3,316/1.

Taylor circulated the memo to the team. Singer also pressed Taylor to convey the idea that the producers should be thinking in terms of 'segments' rather than programmes, except for the minority of cases where they were selected to be single-subject programmes.[165] Taylor acted on this, though it was necessary for some of the whole programmes already planned to go ahead.[166] (These came out in due course as 'Learning from machines' (6 January 1965, produced by Jill Wood), 'The technique of change' (20 January 1965, on Bell Labs, produced by Michael Latham) and 'Science and the artist' (17 February 1965, produced by Ramsay Short)). Singer continued to press Taylor: 'We must not be afraid of holding segments in reserve or tackling studio items at the last minute and we must gear ourselves to be flexible enough to do this'.[167] Congruent with this direction from Singer, Taylor wrote to Jill Wood proposing that the first 1965 programme be on the '£.s.d. of Science':

> I do not want to suggest that we should attempt an exhaustive documentary on the subject but rather use it as a loosely unifying idea for a magazine-like programme of the kind we shall have to do a number of next year – something nearer the 'Monitor' pattern.[168]

From the sixth issue of the year (3rd March), *Horizon* consistently moved on to achieve the originally intended magazine format, carrying most often two items linked by an anchorman, very much in the *Monitor* style, and with different producers responsible for the different segments. The issue on 23 June 1965, for example, featured an interview with Jacob Bronowski, then at the Salk Institute (produced by Short, on tape); an item on a solar eclipse produced by Peter Goodchild in the studio with film inserts; and the demonstration of a machine designed to help teach speech to deaf children (produced by Peter Cantor, on film). From May 1965, this magazine format was emphasized in the *Radio Times* billings by adding the strapline 'a review of the sciences'.[169] It is clear that the team were not necessarily convinced by the format; Dick Gilling wrote a memorandum to Taylor in July 1965 proposing abandonment of the magazine approach on the grounds of economy. His proposal for 'an integrated series of programmes' is remarkably close to the themed-programme approach developed eighteen months before by Short and Daly.[170]

A corollary of returning to the magazine format was that the issue of an anchorman became pressing once more. In December 1964, Singer was pressing Taylor to consider further anchormen and reporters, suggesting John Maynard Smith, David Lutyens and John Irving.[171] The project eventually succeeded and, consistently from March 1965 to November 1966, the programme had an anchorman, but, unlike the early attempts, not a working scientist; rather they chose the BBC News Department's science reporter,

165 Singer to Taylor, 4 December 1964, T14/3,316/1.
166 Taylor to Singer, 9 December 1964, T14/3,316/1.
167 Singer to Taylor, 14 December 1964, T14/3,316/1.
168 Taylor to Wood, 18 November 1964, T14/3,316/1.
169 *Radio Times*, 20 May 1965, p. 43.
170 Gilling to Taylor, 'Horizon planning', 13 July 1965, T14/2,194/1.
171 Singer to Taylor, 'Horizon', 14 December 1964. Memo refers back to a GRT memo of 9 December, and also urges a more journalistic approach.

Colin Riach, and then Christopher Chataway, one-time athlete, ex Independent Television News (ITN) and *Panorama* presenter and sometime Tory MP.[172]

Even in the context of a fairly formal bureaucracy, the archive reveals significant difficulties experienced by Taylor as editor of the programme, including reported overwork related to continuing problems recruiting a secretary with knowledge of the BBC (he continued to see himself, a contractor, as an outsider).[173] More seriously, there is evidence of tension between him and some of his producers, which led to him demanding an apology from Michael Latham for 'insubordination'.[174] Taylor attempted resignation at the end of 1964, though Singer persuaded him to stay on.[175] He was evidently very unhappy:

> I have become increasingly pessimistic about the viability of the whole operation. It is not only that we are trying to make a programme of ideas with people who are not interested in ideas; even more fundamental is the fact the HORIZON team is not a team. It consists of ambitious individualists determined to make the programmes as they think they should be made.[176]

In accepting Taylor's concession that he would stay on – as *Horizon* editor rather than as chief science assistant – Singer asserted,

> It is obvious that you have to be left on your own to get on with 'Horizon'. There has been enough interference with the project and the time has now come to let the programme gain strength without harassment by myself and others. There has been conflicting advice about 'Horizon'. Part of the problem is that everybody thinks they know better than the editor including the producers.[177]

After agreeing to stay after another bout of uncertainty in May 1965, Taylor wrote to Singer in February 1966 announcing his decision finally to resign from the editorship:

> I have come to the conclusion that I have been running HORIZON long enough … it has been hard work and I feel I am becoming stale. I did not want to give it up until the programme was on its feet, but I think it can be regarded as established.

He stressed that he was keen to have time to write another book.[178] Singer, who held Taylor's skills in very high esteem, had nevertheless conceded in private that 'although a good "ideas man" for "Horizon", he is not an ideal producer for he is not strong in leadership or flair'.[179]

In retrospect, Taylor's tenure as editor was remarkable for the fact that he was able to realize the original vision for *Horizon*; a magazine programme in the *Monitor* mould, with diverse segments that posed ideas, revealed the ways that scientists thought and

172 Stephen Bates, 'Sir Christopher Chataway obituary', *The Guardian*, 19 January 2014.
173 Singer to EOP Tel, 31 July 1964; see also EOP Tel to Singer, 25 March 1965, TVART3 GRT.
174 Taylor to Latham, 11 January 1965, TVART3 GRT.
175 F.L. Hetley to Singer, 31 December 1964, TVART3 GRT.
176 Taylor to Singer, 11 January 1965, TVART3 GRT, original emphasis.
177 Singer to Taylor, 11 March 1965 , TVART3 GRT.
178 Taylor to Singer, 23 February 1966, TVART3 GRT.
179 Singer to Attenborough, 18 May 1965 , TVART3 GRT.

what kinds of people they were. Against this achievement must be placed the dysfunction of his team. Too little research has been done on television output more broadly in this period to be able to judge this achievement against that of the editors of other programmes in the fledgling BBC2. But whatever the balance, it seems that by the time he left, both producers and the BBC hierarchy were ready for a different model.

Robert Reid becomes editor

Taylor left the editor's post in April 1966 and Robert Reid was announced on 5 August, taking up the post with immediate effect (Dick Gilling had held the fort in between).[180] Reid's reputation was for making television films on the history of physics, including *Einstein* (27 April 1965) and *The Building of the Bomb* (2 February 1965). In retrospect it seems to be no coincidence that a filmmaker should be made editor as, by his own account seven years later, he 'became editor of … *Horizon* and turned it into the documentary film series which it still is today'.[181] A memo from late September 1966 shows that he was seeking to shift the balance from studio to film, requesting extra editing time in exchange for giving up studio bookings, thus 'improving the programme standard at no extra cost'.[182] This is a clear sign that moving to film was understood to enhance quality in a way that the loss of immediacy from the studio could not counteract. Singer made the point to Attenborough (controller, BBC2, from March 1965[183]); the additional film effort proposed would enable one of the two programmes per month to be made entirely on film.[184] Finally, in July 1967, Reid won the argument; Attenborough accepted 'the need for an increase in production staff *now that the programme has changed from a magazine to a series of single 40 minute documentaries*'.[185] Similarly, a year later Reid was granted an additional assistant producer in his team on the ground of his own overstretch.[186] The transformation was not instantaneous, but virtually all issues after the programme had begun broadcasting in colour – starting with Anthony Isaac's 'Lords of the sea' (10 October 1967) – were made and edited on film, complete before broadcast, with each issue normally on a single subject, not simply material organized under a single theme. We may note that this was a resolution in the opposite direction from that of the 1950s – a move *from* the excitement and simultaneity of live television *to* the production values of documentaries made on film.[187]

180 Taylor to A. Haddow, 29 April 1966; 5 August 1966, T14/2,196/1. The memo stresses that the appointment is 'with immediate effect'; Leslie Page to Distribution B, 'TV Service OB Group', T14/2,194/1.

181 Dust jacket biographical note, Robert Reid, *Microbes and Men*, London: BBC, 1974.

182 Reid to Singer, 27 September 1966, T14/2194/1.

183 Peacock was moved to become controller of BBC1; anon., 'Reshuffle in BBC TV posts. Mr. Wheldon promoted', *The Times*, 26 February 1965, p. 6; David Attenborough was reported as his successor on 5 March; anon., 'Mr. David Attenborough is new B.B.C.-2 Head', *The Times*, 5 March 1965, p. 6.

184 Singer to Attenborough, 'Horizon film facilities', 28 Sepembert 1966, T14/2194/1.

185 Joanna Spicer to Singer, 17 July 1967, T14/2194/1, my emphasis.

186 Wadsworth to Attenborough, 3 July 1968, T14/2194/1.

187 Boon, op. cit. (2), p. 207.

Reid's shift of *Horizon* style entailed a move away from the use of 'anchormen' because with this very different style of programme it was no longer necessary to link disparate items. The guiding voice in *Horizon* increasingly became that of a narrator rather than a presenter. But by this date presentation conventions had also diversified. Many *Horizon* programmes in 1966–1967 were billed as 'introduced by' Christopher Chataway, and hybrid presentation forms had evolved; even in single-subject films, presenters might sometimes start as off-screen narrators then later appear on camera, as Chataway did in Peter Goodchild's programme on Second World War innovations, 'The war of the boffins' (12 September 1967).

Factors involved in the transition to this stable film form for *Horizon* may have included the arrival of the more newsy science magazine programme *Tomorrow's World* on BBC1 from July 1965. In making the argument for this new programme on BBC1 in November 1964, Singer inverted the arguments previously made against topicality for *Horizon*. He stressed that BBC2's science coverage was well organized; BBC1's treatment of science and technology was in his view 'haphazard'. Long production schedules for existing BBC1 science documentaries meant that programming could not be sufficiently topical, and this topicality is what he judged to be appropriate for the new programme.[188]

The increasing availability of staff and equipment may also been a significant factor. At the beginning of BBC2 there was a great deal of competition between programme makers across the BBC television service for a limited resource of film footage, crew and editors, and for the very limited number of Ampex video recorders. The establishment of BBC2 had required significant extra effort to ensure that the facilities would stretch to the extra twenty-five, and then thirty, hours of broadcasting per week. The staffing increase was also substantial: nine hundred new appointments, according to Briggs.[189] The general shortage of facilities specifically affected the *Horizon* team in the run-up to the first programmes, and across the first few years. As we have seen, Ramsay Short in January 1964 had raised the issue of the timing of acquiring their own film unit. In late February 1964, Singer had to concede having only two (rather than the three) weeks' film effort per programme because 'the three weeks film effort that we were offered is simply not available and we had to accept two or withdraw the programme from offer'.[190] The problems persisted in the Taylor period too; for example, he had to press for more film-editing time,[191] and Jill Wood complained of not having enough time on the Ampex video machines comfortably to complete the studio programmes shot 'as live' a few days ahead of transmission.[192] On the staffing side, we have seen the complaints about having to make two inadequately staffed teams out of one good one, and the worries about the relative inexperience of the team.

188 Singer to D Tel (Baverstock), 'Science and technology on BBC1: a reappraisal', 23 November 1964, T16/623.

189 Briggs, op. cit. (16), p. 405, p. 407.

190 Singer to Daly, 26 February 1964, T14/3,316/1.

191 Taylor to Chief Assistant OBFS Tel, 12 November 1964, T14/3,316/1.

192 Jill Wood to Taylor, 'Videotape Editing', 29 December 1964, T14/3,316/1.

Conclusions

In this microhistorical account, I have shown how very significant was the decision by the originators of *Horizon* to emulate *Monitor*. In opting for this prototype, we might say that it was this genre that persisted – into new subject areas – at the expense of Singer's older model of live science broadcast from the laboratory.[193] This initial decision led to the person-centred emphasis on the culture and the social rootedness of science, which were seen in all three phases of the programme discussed here. It also affected the choice of representational conventions that were followed in seeking to achieve that account, whether that was a predominantly narration-led documentary film complete before broadcast or a magazine programme live from the studio with anchor-man; whether it had several diverse segments, or arranged similar material under one unifying theme, or was on a single subject. It is significant, given Leach's emphasis in the very first memorandum of the need to link the account of science to representational means, that it was the use of film over studio that enabled the programme to achieve a stable form four years later. But Leach's insistence that it was necessary to vary the representational means 'in technique (film as against studio, wild track/synch sound/silence on film, etc)' for *Horizon* to have the same appeal as *Monitor* does not seem to have persisted in the post-1967 style, partially perhaps because the programme had made the case for the person-centred, more 'philosophical' account of science.

It is possible to detect the preferences of the individual key players being enacted in the different phases of the programme discussed here: Singer seems to have been the main force behind the magazine format and only really gave up on it when Taylor left. Daly, in his brief stint, showed in 'Strangeness minus three' his taste for clever science communicators and their philosophy of science. Short showed how documentary films could convey the culture of science, but with a quirky interest in its peripheries – with amateurs, the autodidact Fuller and a conjuror. Taylor's magazine-format *Horizon* achieved his aim to make television designed to provoke discussion about science.

At this point of conclusion, is worth pausing to consider the sources of *Horizon*'s account of science, 'to present science as a field of continuing human endeavour and achievement, as lively, varied and rewarding as any other, and to place new developments in science in their total context – personal, social, historical, political.'[194] It might seem natural to assume that any early 1960s account of science that stressed its culture must derive from Snow's 'two cultures'. But this would be to assume that Snow's unhelpful dichotomy had the currency in that period that it has subsequently acquired.[195] More to the point, we have seen that Snow did not occur explicitly in any of the lengthy and explicit documentation on the 'philosophy of *Horizon*'. If we look for what influences the team did cite, then a single sentence from Peter Medawar that 'science cannot be divided between what is up to date and what is merely of antiquarian interest, but is to be regarded as a growth of thought', is the sum total.

193 Boon, op. cit. (2), p. 3.

194 Daly to Singer, 'Horizon proposal', 23 January 1964, T14/3,316/1.

195 Guy Ortolano, *The Two Cultures Controversy: Science, Literature and Cultural Politics in Postwar Britain*, Cambridge: Cambridge University Press, 2011.

Hoskin's discussions over current trends in the history of science for the aborted Galileo programme, and contacts with Bernal, Haldane, Bronowski, Pyke, Maynard Smith and the rest, may well also have influenced their approach, but if so there is nothing explicit in the archive. By contrast, we do know that emulating *Monitor* – in programme format and in transferring a way of representing art and artists to the treatment of science and scientists – was a major concern of everyone involved. We have to conclude that, as Singer said in 1966, the televising of science really was a process of television, not just in the sense that it was the trade of television producers, but in the sense that the televisual social account of science originated in television, and not from science or broader commentary on science.

To some extent the narrative of this essay is also its method; just as the makers of *Horizon* determined to concentrate on what kind of world the world of science is, and on what scientists talk about, so I have asked the same questions of the people who made the programme; I have asked what kind of world the world of science television is, and concentrated on what television producers talked about. If this seems recursive, it also seems highly significant because our discipline and theirs share common cause in our mutual concern with the social rootedness of science. It will take more than a micro-history to establish the extent to which there may be common historical roots to this shared concern.