Science, Observation and Entertainment: Competing Visions of Post-war British Natural History Television 1946 – 1967

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Abstract

Popular culture is not the endpoint for the communication of fully developed scientific discourses; rather it constitutes a set of narratives, values and practices with which scientists have to engage in the heterogeneous processes of scientific work. In this paper I explore how one group of actors, involved in the development of both post-war natural history television and the professionalisation of animal behaviour studies, manage this process. I draw inspiration from sociologists and historians of science, examining the boundary work involved in the definition and legitimation of scientific fields. Specifically, I chart the institution of animal ethology and natural history filmmaking in Britain through developing a relational account of the co-construction of this new science and its public form within the media. Substantively, the paper discusses the relationship between three genres of early natural history television, tracing their different associations with forms of public science, the spaces of the scientific field and the role of the camera as a tool of scientific observation. Through this analysis I account for the patterns of co-operation and divergence in the broadcasting and scientific visions of nature embedded in the first formations of the Natural History Unit of the British Broadcasting Corporation.

In spring 1957 the previously informal collaborations between naturalists, broadcasters and scientists directed at taking and broadcasting film of animals for British television were recognised in the establishment of the Natural History Unit (NHU) of the British Broadcasting Corporation (BBC). Self sufficient with its own producers, library and film editing facilities, and eight permanent staff, and based in Bristol, the NHU was charged with supplying the majority of natural history output on the BBC[1]. In a paper to the BBC Board of Management, Unit pioneer Desmond Hawkins identified the vision of natural history television framing their early development. In what has been called 'the most important and influential document in the Unit's history'[2], he asserted:

> 'The spirit of scientific enquiry must have pride of place. In handling this subject we expose ourselves to the critical scrutiny of scientists, and their approval is an important endorsement. Moreover, it is their work that throws up the ideas and instances and controversies from which programmes are made. We look to them as contributors, as source material, as consultants, and as elite opinions on our efforts. In short we need their goodwill'[3].

The choice for head of Unit, the ornithologist Bruce Campbell, reinforced an ethos in which scientific skills were valued above broadcasting experience. As Chris Parsons writes in his history of the Unit: 'Although he had no experience as a producer, Bruce [Campbell] had shown himself to be truly interested in broadcasting and his impeccable ornithological background, together with his involvement with various naturalist's organisations provided just the right credentials for the leader of the NHU at the time'[4]. Certainly, there was competition from other styles of natural history television. Wildlife adventure programmes, previously successful in the cinema; broadcasts of the popular spectacles of the zoo; and a scientific vision of nature that emulated the naturalist's lecture all featured in early natural history broadcasts. However, only one genre was widely supported by filmmakers and

institutionalised within the first formations of the NHU; an expert vision of nature that stressed the importance of field observation and scientific interpretations of animal form and function.

Through the lens of the BBC's Natural History Unit, this paper explores how negotiations over the meaning of natural history films were implicated in the co-constitution of post-war broadcasting and natural history sciences. I argue early natural history television was not the endpoint for the communication of fully developed scientific discourses on animal behaviour, but constituted a set of narratives, values and practices with which both scientists and broadcasters engaged. The paper traces relationships between broadcasters, filmmakers and scientists simultaneously involved in the formalisation of a unit for the production of natural history films and the establishment of animal behaviour studies as a biological science. From a loose association of individuals interested in the development and communication of natural history, patterns of co-operation and divergence emerge, which can be traced through discussions of the appropriate vehicle for the presentation of natural history on television. This paper examines these competing visions of nature as individuals are brought together by a belief in the restorative power of the natural, the moral value of field observation, and the camera as a tool of science as well as of entertainment. Shared values in the public science of natural history and ethology, an emerging field science for the study of animal behaviour, establish natural history films as boundary objects, ensuring co-operation is achieved, even though the films have different meanings to participants.

The research deals symmetrically with the natural science and cultural production of natural history filmmaking, positioning the development of natural history television within accounts of boundary making practices between nature and culture, expert and lay, subject and object[5]. The work speaks theoretically to a growing dialogue between cultural geography and science studies through its treatment of science as a set of material and social

practices located in particular places[6], extending this to argue for the importance of the spaces of popular culture in the constitution of science. I have also drawn productively from recent work on animal geographies, which explores the material and symbolic spaces occupied by animals in human culture[7]. Woven through accounts of early natural history filmmaking are reflections on the establishment of a proper location for understanding animal behaviour, whether that be the zoo, the safari or the field; the moral value attributed to interactions with animals in certain environments; and the formulation of an appropriate aesthetic regime to represent this in both scientific and public communications. Through its particular focus on the institutional formation of the BBC's NHU, a third literature to which this research alludes is that on the development of organisations[8]. This reminds us that processes of organisation are necessarily heterogeneous, and thus whilst suggestive of a common myth in the development of early British natural history filmmaking, this paper does preclude the importance of other formats for the presentation of animals on television in the later history of the Unit[9]. The research draws on a range of interviews and documentary evidence within the NHU, including films, scripts and papers, as well as published accounts of the development of the Unit and biographies of key individuals involved in the multiple contexts of post-war British natural history.

The paper is presented as follows. Firstly, I consider research on the role of popular culture in the construction of science, drawing on three modes of boundary work between science and non-science that have proved productive in historical accounts of natural history. Secondly, I discuss the context for the emergence of natural history filmmaking, and describe conceptions of natural history films from several different but related worlds, including those of the broadcaster, the ethologist and the natural history filmmaker. Thirdly, I introduce three programme formats illustrating experiments in early natural history programming. I explore how wildlife adventure programmes, outside broadcasts based in the zoo, and the television format of the naturalist lecture are all responses to the challenges and contexts of

early natural history filmmaking. Through their different technologies for filming animals and the narratives used to frame animals and environments each type of programme suggests a particular model of human and animal interaction and presents a divergent view of nature. The patterns of centrality and marginality that emerge within these genres of natural history filmmaking are explored through their intersection with the changing practices of natural history sciences, broadcasting and natural history filmmaking. Concluding, I reflect empirically on the subsequent development of the Unit and theoretically on the importance of considering the role of the media in the spatialisation of differently situated scientific knowledges.

Bounding Nature: institutional science and popular culture

Historians of science have persuasively argued against conceptions of the popularisation of science that assume the existence of two independent and monolithic cultures – expert and lay – and construct science as a body of pre-established facts which are communicated to a passive public[10]. Shapin, for one, asserts that the professionalisation and popularisation of scientific knowledges are coterminous[11]. Publics are not involved only as audiences for non-controversial science constructed in the laboratory, museum or field, but are a constitutive part of the processes of producing and negotiating scientific methods and knowledges. On this basis popular culture is not simply the end point for a fully developed scientific discourse. Rather, it offers a set of identities, spaces and technologies which scientists have to negotiate in the establishment of scientific boundaries, the public legitimation of science and the differentiation of scientific and lay visions of nature.

Thomas Gieryn's concept of boundary work captures this process[12]. Gieryn explores the processes through which scientists assert the autonomy of scientific practices from applied science or technology, in order to lay claim to funding, whilst simultaneously claiming

science as the foundation of technological progress. The notion of boundary work draws attention to the processes through which scientists, science journalists and the other allies define, delimit and defend certain fields; maintaining boundaries between science and non-science, science and technology and different paradigms of science. Scientific work is both heterogeneous and co-operative, and boundary work simultaneously connects and differentiates diverse interests within the locations of science, as well as linking core scientific debates to public science metaphors[13]. The task of demarcating science from non-science is a social process involving the attribution of selected characteristics to the practitioners, methods, knowledges, values and institutions of science[14]. It involves multiple actors engaged in negotiations between different worlds and, as Gieryn indicates, boundary work is complex, contested and contingent[15]. Three key modes of boundary work are valuable for understanding relations within the contexts of British post-war natural history: the public presentation of science, the spaces of field observation and the technical objects of scientific practice.

An important facet of boundary work is distinguishing science from other activities through advocacy in a cultural space, located a significant distance from the spaces of science[16]. Turner identifies public science as 'the body of rhetoric, argument and polemic produced [...] to persuade public or influential sectors thereof, that science […] is worthy of receiving public attention, encouragement and financing'[17]. The process of forging space for new forms of scientific understanding simultaneously involves creating a public form, or public science. This has historically been a literary form[18]. The nineteenth century saw an explosion in new journals and books about natural history, providing the means of communication between specialities and between men of science and the public[19]. Such communication contexts advocated public support for science and, through the religious, intellectual and utilitarian values claimed for it, distinguish the identity of amateur and professional. A similar role is played by the boundary work of public demonstration or

experiment, which effectively legitimises science through a smooth public presentation concealing the untidy craft of the scientist: 'caging Nature's caprices in thick walls of faultless display'[20]. Public science functions as the front stage of scientific professionalisation. As Livingstone suggests 'the Goffmanesque distinction between front and back regions, between public and private spaces snakes its way through the experimental programme more generally'[21].

The rhetorical strategies through which public science is presented are important[22]. Following Myers, it is possible to identity the use of both 'narratives of nature' and 'narratives of science' in negotiating scientific value and identity[23]. The former are important in legitimating the relative positions of competing scientific paradigms through reference to wider discourses of nature that reinforce the social values of science[24]. Boundary work is also achieved through attributing unique characteristics to a scientific identity through narratives of science. In creating the role of natural history professional, the counter category of amateur is simultaneously forged through a narrative of science that inscribes intellectual and social boundaries of class and gender[25]. This is often pursued in public presentations seeking to fashion a credible scientific identity through using rhetorical devices that displace other actors[26].

Secondly, boundary work between science and other activities depends crucially on where practices are positioned, and on the spaces privileged for science. This builds explicitly on geographical interests in the location of science. As Thrift et al observe, 'the study of science as a social construction has been pursued through a peculiarly spatial imaginary, which always attaches insight to the site. The locales in which scientific knowledge is produced are not seen as passive backdrops, but as vital links in the chain of production, validation and dissemination'[27]. Laboratories, field sites, scientific institutes and museums are socially and materially constructed as locations privileged for the practical activities that

make and sustain scientific knowledge. Boundary work between scientists and publics are embedded in social and spatial relations, both in constructing legitimate locations for scientific observations and in the means of authoritative communication that transcend these sites[28]. From an initial focus on the laboratory, sociologists and historians of science are increasingly exploring other sites important in the construction of scientific knowledge including the natural history museum, botanical garden, and the varied sites of fieldwork[29].

The contested status of the field as a legitimate site for the generation of knowledge about nature is particularly important in the development of the natural history sciences. Field studies have generally had low status within the biological sciences[30]. Unlike the laboratory, zoo or museum, the spaces of the field cannot easily be restricted to sanctioned scientists nor controlled for experimental conditions. Field studies suffer from accusations of subjectivity, and scientists struggle to enable an authoritative travel of knowledge between the undisciplined spaces of observation and the point of data analysis. Tensions between field naturalists and cabinet or museum naturalists can be traced from the eighteenth century onwards[31]. Burkhardt explores the diverse strategies pursued by naturalists from Cuvier, through Yerkes and Tinbergen, to establish the credibility of observation in the field for animal behaviour study. He introduces diverse boundary strategies for constructing the scientific field, including establishing the identity of a trustworthy observer, excluding other actors and using scientific instrumentation to assert the credentials of the field as a proper setting for the generation of scientific knowledge[32].

As indicated above boundary work also takes places through the negotiation of objects. In their study of the reorganisation of ecological research at the Berkeley Museum of Vertebrate Zoology Star and Griesemer discuss how co-operation is achieved through practices and objects that have varied meanings to diverse actors of science operating within different worlds. They define boundary objects as those ‘both plastic enough to adapt to

local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites. [...] They have different meanings in different social worlds but their structure is common enough to make them recognizable, a means of translation.'[33] Boundary objects account for co-operation between heterogeneous viewpoints. In their study, such objects support the definition and maturing of the different worlds of museum administration, amateur collection and research science by standardising the interfaces between them. 'The management of diversity proceeds with the use of objects which originate and continue to inhabit different worlds and which incorporate different meanings to make them coherent'[34]. Shared goals are lined up, which enable actors investing in the collaboration to work together despite their positions in different worlds.

In natural history work, boundary objects are produced when sponsors, theorists and amateurs collaborate to produce representations of nature[35]. Their boundary nature is indicated by their existence as concrete and abstract, particular and general, conventionalised and customised. In the representations of twentieth century natural history, negotiations between actors on the status of visual observation, instrumentation and data recording are frequently articulated around the role of the camera. The camera as a boundary object is introduced in the work of Latour[36] and Winston[37], and illustrated as an important point of negotiation within the complex matrix of science, art, hunting, education and entertainment in American natural history in the work of both Gregg Mitman and Donna Haraway[38]. The primate behaviour films of Clarence Ray Carpenter feature in Haraway's account of the discipline, as film becomes a key component in the development of field primatology. Similarly, Mitman suggests the camera supports the credibility of field science through enabling observations in the field to transcend the point of observation[39]. The power granted to the camera as a scientific tool, able to move between the field site of natural history and the demands of scientific biology, was significant in the development of field animal behaviour studies. 'No longer dependent upon notebook and pencil, the biologist or

anthropologist could record movement and behaviours on a medium that could then be transported to the laboratory, where movements could be slowed down and behaviour analysed, spliced, and edited'[40]. Film offered the opportunity to make the study of animal behaviour in the field more scientific.

However, film is also a technology of entertainment and the use of hoaxing and set ups to increase the spectacle of early wildlife photography in the United States was rife. Scientific film pioneers, such as Carl Akeley at the American Museum of Natural History, set themselves against faking by encouraging associations with wildlife photographers Martin and Osa Johnson in attempts to secure and standardise film's scientific credentials[41]. A reading of the camera's ability to witness animal behaviour had to be sought and could not be assumed. As Haraway concludes, 'the camera, an eminently democratic machine has been crucial to crafting stories in biology. [However] its control has eluded the professional and the moralist, the professional scientists'[42]. The apparent accessibility of this visual media challenges scientists' need to discipline access to means of representation and secure authority. In the interlinked worlds of field observation and natural history filmmaking, cameras and film are boundary objects whose stabilisation is sought to enable the necessary collaboration between divergent worlds. I would assert these negotiations around public science, the places of science, and film as a boundary object could also be traced in the complex worlds of post-war British natural history.

Television, natural history and natural history television

Renewed transmissions of BBC television in 1946 introduced a new opportunity for the communication of ideas and images of animals within an already complexly configured space[43]. The worlds of broadcasting, biology and natural history in Britain were undergoing a number of transitions during this period. These contexts were shaped by an influential set

of individuals involved in planning, ecology, ethology and broadcasting; moving across disciplinary boundaries more fluid than today. The worlds of professional biology and natural history were relatively close-knit, with amateurs and professionals mixing within clubs and societies, and working together on expeditions, at conferences, editing books and making television programmes together[44]. These associations, centred on organisations like The British Trust for Ornithology, The Royal Society for the Protection of Birds, the British Ecological Society and the Royal Zoological Society, were highly influential: for example in formulating shifts from preservation to conservation in planning for nature reserves[45], and in rejuvenating field studies for the understanding of whole organisms within the biological sciences. The contexts for television were equally complex, but less well established. Television was relatively experimental in the 1950s, with limited resources, few proven formats or experienced staff. Natural history filmmakers operated across these worlds, building links within British regional contexts like London, Oxford and Bristol, through shared interests in developing and communicating a particular vision of nature. I now turn to chart these intersections between the visions of broadcasters, ethologists, and natural history filmmakers: three simultaneously moving targets, each changing shape to effect the position of the others.

The broadcaster's vision

The 1940s saw wide support for popular natural history, embracing conservation groups, nature photography and film, radio broadcasts and publishing ventures[46]. The resumption of television broadcasts after the war appeared to offer scope for furthering this. A small group of radio producers, broadcasters and scientists centred around the BBC in Bristol, including Desmond Hawkins, Peter Scott and James Fisher, had already established their reputation for natural history radio through home service broadcasts such as *The Naturalist* (1946), *Bird Song of the Month* (1947) and *Birds in Britain* (1951). New ideas on nature and nature

conservation were also popularised through publishing innovations like the Collins *New Naturalist* series[47]. The editors of this series, Dudley Stamp, James Fisher, Julian Huxley and John Gilmour, pioneered the publication of books combining the latest scientific research with a popular but unsentimental approach to natural history, based on field study. These books synthesised a British naturalist tradition with new developments in wildlife photography overseen by Eric Hosking; the artistic modernism of Clifford and Rosemary Ellis' dust jackets; and the developing fields of ecology and ethology. Nature was diverting and healing for a nation recovering from war, reasserting links with past but also looking to the future. As James Fisher reputedly said to publisher Billy Collins in 1942: 'what this country needs is a good series of books on natural history to take its mind off the carnage'[48]. Natural history combined traditional values of empirical observation and the search for order, with an emphasis upon scientific problem solving, planning and educated citizenship held in high esteem in post-war British culture.

Television presented both opportunities and constraints for this public science of natural history. Broadcasting at the BBC was strongly shaped by the vision of the first Director General after the war, William Haley, who developed radio broadcasts in line with Reith's original intentions to 'inform, educate and entertain'[49]. He channelled resources into educational programming, introducing the Third programme in 1946 and the Reith lectures in 1948[50]. He did offer a supportive slot for natural history radio broadcasts from Bristol, scheduling them on Sundays after the one o'clock news[51]. However, he was less interested in developing the medium of television[52]. Television was still unproven in the late 1940s and early 1950s, with restricted signal transmission and audiences and limited funding[53]. Compared to the large audiences and symbolic national presence radio achieved during the war, television was a minority concern with few specialist staff or programming strands. Television focused on emulating radio formats, with live outside broadcasts of national events such as the Olympics, the Proms and the Coronation; competing with cinema for

immediacy, rather than attempting to emulate the quality of celluloid projections[54]. Live television, with its well-lit studios and large unwieldy electronic cameras, was a difficult environment for filming animals. Outside the studio where developments in lightweight Bolex and Arriflex film cameras had made ciné film more portable, there were still technological restrictions. Film stock required large quantities of light, limiting filming to animals active in daylight. Lens magnifications were constrained by technologies in glass lens manufacture, so filmmakers had to approach close to the subjects being filmed. Both features in London and West regional programming in Bristol endeavoured to overcome these problems, contributing a number of experimental strands and one off programmes. The BBC also bought in existing film from filmmakers previously popular in the cinema. However, in 1953 the BBC had no formalised policy for the production of natural history programming.

The BBC was, however, motivated by competition as this period progressed. The arrival of commercial Independent Television (ITV) in 1955 meant British broadcasters sought to exert more direct control over film content and ownership, and to monitor and react to audiences. This was particularly important following the arrival of the ITV wildlife strand *Survival* in 1961. ITV broadcasts did not necessitate direct competition over scheduling, but did require the BBC to generate greater flexibility to audiences and better allocation of television resources. The ITV need to monitor and respond to commercially meaningful audience figures put pressure on the BBC to compete for respectable audience share. The BBC's audience research department was introduced in 1955, challenging the autonomy of its educational vision[55]. The development and maintenance of programme strands, balancing education and popular influences on programme content, were increasingly organised under the administration of a ‘unit’ within the BBC. Units were allotted a certain amount of broadcasting time, whilst producers within the unit were confined to proposals that conformed to the unit's general brief[56]. In summary, BBC broadcasters recognised the

potential for natural history programming, but required a demonstrable track record before committing resources to a unit for this genre.

The ethologist's vision

The period prior to and following the Second World War saw development of the two most prominent approaches to the study of animal behaviour developed in the twentieth century – ethology and comparative psychology. Ethologists, such as Konrad Lorenz, Nikolaas Tinbergen and their associates, tended to study birds, fish and insects under field conditions. Their methods involved detailed observations and experiments in nature to reveal innate behavioural patterns related to evolutionary processes. Lorenz laid down many of the theoretical foundations of the new field of ethology through work on captive wild animals, reared in near naturalistic conditions in a special experimentation station at his home in Austria where he could observe their behaviour closely[57]. The Dutch naturalist, Tinbergen focused on field observation and experimentation, devising simple problems he could put to animals in the wild without disturbing them unduly[58]. The British naturalist, Julian Huxley, himself a pioneer of the meticulous observation of birds in their environment, shared their ideals and was influential in bringing this research to the UK[59]. Ethologists channelled their work onto the visual sense, and made extensive use of film in research and public presentations of their work[60]. Competition for their interpretation of animal behaviour came from comparative psychologists, mainly based in the United States, who largely studied mammals under laboratory conditions and focused on learnt behaviour patterns[61].

Both communities of researchers responded to challenges facing animal studies following decline in support for morphological and taxonomic studies and the rise of molecular biological experimental science[62]. However, they differed in their practices. Located in the field, classical ethologists worried about the distorting effects on natural patterns created by

moving animals from nature to the laboratory. Conversely, comparative psychologists were concerned about the lack of experimental control in the field, the absence of data analysis and ethologists' failure to consider environmental factors in development[63]. Ethologists had to fight to establish the idea that animal behaviour could best be understood by examining it in its 'natural' surroundings[64]. The field as a place of science, the status of the naturalist's vision and the moral value of empirical observation were central to boundaries between the concepts and practices of ethology and comparative ethology.

Early ethologists also differed from comparative psychologists by setting great store by their ability to communicate their vision of nature to the public, writing popular books and magazine articles for publications like *Country Life*[65]. Tinbergen was 'keen to disseminate his ideas and discoveries about animal behaviour as widely as possible'[66] appearing in many films and television programmes. Tinbergen emphasised this in his teaching: 'I try to impress on my students that half their work is communication. Science is a social effort, and scientists must adjust to the public'[67]. Ethologists recognised the importance of public science. However, it was not a pre-determined scientific vision that was communicated. Dominant throughout their public presentations was an emphasis on the wonders of nature, the pleasures to be derived from its study and the importance of fieldwork as the proper location for the study of animal behaviour. Studying nature was simultaneously an exercise in accomplishing an ideal society and field observation was a moral value before it became the hallmark of scientific ethology[68].

In most accounts of this period of animal behaviour studies, the vision of ethologists dominates that of comparative psychologists. Dewsbury, for instance, identifies five dimensions in which ethologists could be said to have triumphed: through an evaluation of rhetoric used to describe their achievements; their presence in scientific histories of the period; their relative influence in cognate fields such as psychology; their role in training

future biologists; and the 1973 Nobel Prize in Physiology or Medicine awarded to Lorenz, Tinbergen and Karl Von Fisch[69]. However, there is often a contradiction within accounts of the dominance of the ethologist's vision of nature. Roell, for one, attributes the ethologist's success to their adoption of scientific method and experiment[70]. In comparison with the laboratory rigour of comparative psychologists this seems difficult to substantiate. The power of ethology as a new set of practices and interpretative tools for understanding animal behaviour was not simply established by allying itself to the values of objective science. Ethology is a complex, contingent, historically situated and evolving set of practices and concepts forged by a disparate community of researchers and other allies. In forging this new vision for animal behaviour studies a key role is played by scientific interactions with the media.

The natural history filmmaker's vision

[Approx. position Image 1]

In the early 1950s a diverse set of individuals, including many mentioned above, began to experiment with natural history television broadcasts from Bristol. Desmond Hawkins, previously writer, editor of literary criticism and radio producer in London, moved to Bristol after the war to take a course in television production and pursue interests in natural history[71]. Hawkins' interests in nature and broadcasting inevitably brought him into contact with the naturalist, painter and broadcaster Peter Scott. Scott had radio and television experience, skills in filming and painting wildfowl, and was in the process of setting up the Wildfowl Trust at Slimbridge in 1946, just up the Severn Estuary from Bristol. They were joined by the studio engineer Tony Soper, one production assistant paid for by television and the assistant film editor belonging to the West Region Film Unit, Chris Parsons[72]. These few individuals established links to the worlds of post-war natural history via other naturalists in

publishing, conservation and scientific activities. An article on the *New Naturalist* photographic editor Eric Hosking illustrates the nature of these informal associations: 'A chance meeting with the well known ornithologist Guy Mountfort in a BBC studio led to an expedition to Spain in 1956, and every summer since then Hosking has been abroad adding to his already enormous library of bird photographs. The 1956 expedition was Las Marismas of the Coto Donana in Southern Spain, and was led by Guy Mountfort; party members included Lord Alanbrooke, Sir Julian Huxley, Max Nicholson, James Ferguson Lees and James Fisher'[73]. Early natural history filmmakers later recruited within these networks; 'the people that were taken on here were great bird-watchers or members of the RSPB or Entomological Society, Zoological Society'[74].

Many of these naturalist filmmakers looked to natural history television to provide something they had been unable to find within London broadcasting contexts or biological sciences. Hawkins' interests in literature embraced the study of landscape and nature in Hardy, Lawrence and Eliot, but he was frustrated with the London publishing world. Further, few British universities, outside of Oxford where Tinbergen established a new programme for animal ethology in 1949, then offered the opportunity to study animal behaviour in the field. As David Attenborough reflects, 'when I emerged from my degree the kind of research I saw going on in zoology in Cambridge was not the kind of behavioural ethological research I was interested in [...] I didn't want to go back to looking at dogfish in formalin. So I didn't go back to university at all'[75]. A shared desire to engage in and communicate a specific form of nature contemplation, stressing the primacy of experience and a moral value for fieldwork, motivated these individuals. However, they struggled with limited staff, experience and resources to commission new material and realise this vision. 'Because West Regions' bids were made from premises which were essentially radio-orientated, the means by which it approached the new medium were necessarily basic, [and] invariably inventive'[76]. Further resources and control could most easily be obtained through

the establishment of a centre for the production of natural history television. A unit status would assure commissioning editors in London were committed to a quota of natural history, allowing scope to define their vision for natural history. However, unable to shoot specially new celluloid footage of animals, they were initially reliant on the use of mobile outside broadcast units and studios at Bristol, or existing sources of film from which to build their reputation. Drawing upon disparate modes of communication including the zoo, wildlife safari cinema, and the naturalist lecture, they nevertheless sought to establish a new unit for the production of natural history programmes which met broadcasting requirements and supported an appropriate aesthetic, moral and scientific vision for presenting and interpreting animal behaviour.

Competing visions of natural history television

The first natural history television broadcast after the war was an outside broadcast from Slimbridge in May 1953 presented by Scott and produced by Hawkins[77]. This marked the start of a rich period of natural history programming dominated by three genres of television. The wildlife series of Armand and Michaela Denis were transmitted from 1954; a variety of programmes featuring animals associated with zoos developed from 1954; and the programme strand *Look* was initiated from Bristol in 1955. This section introduces these three film genres and their relationships within the diverse social, spatial and technical worlds of post-war natural history.

Adventures in natural history

Nature films, travelogues, scenics and expedition films had been an important part of non-fiction cinema entertainment since the 1920s. From the incipient days of cinema when Cherry Keaton accompanied Roosevelt on hunting trips to East Africa, wildlife safari films,

featuring explorers rather than naturalists, had become popular forms of animal entertainment. These early films marked a shift from big game safaris to 'hunting with a camera'[78], emulating and communicating the experience of the hunt, but replacing the gun with the camera as the means through which trophies are captured and nature mastered[79]. The filmmaker is still manly adventurer and hero of empire; indeed as Carl Akeley put it 'camera hunting takes twice the man that gun hunting takes'[80]. In these films nature is constructed as a primitive wilderness, 'implicated in broader movements to create and preserve a vision of nature as timeless domain for white Euro-American men'[81].

[Approx. position Image 2]

The Belgians Armand and Michaela Denis, who started making films for cinema with the Renault sponsored *Wheels across Africa* in 1930, brought this format to BBC television in 1954 with the series *Filming Wild Animals*. This husband and wife team focused on the pursuit of animals, composing their films as a quest in which Michaela pursued animals with a still camera and Armand shot their progress using a 16mm portable film camera. The films were located in the national parks and game reserves of East Africa, places forged out of the African landscapes through the preservationist impulses and images of empty wildernesses held by European colonial administration[82]. Their carefully scripted narratives revisited these symbolic geographies, traversing through bush and hunting track, culminating in visits to the game warden's garden. The films are constructed using codes of fiction cinema, allowing the audience to experience the hunt through camera techniques such as point of view shots, and with edited sequences of pursuit adding drama to their adventures. They engage viewers through amusing dialogue, reflecting on the excitement and danger of their expeditions and including the non-expert, as the older Armand introduces the younger Michaela to the wildlife of East Africa. Their interpretations of animals are unashamedly anthropomorphic and include the search for such named individuals as the idiosyncratically

long horned rhinoceros, star of the 1958 film *Search for Gertie*[83]. The following extract spoken by Armand, accompanied by visuals cutting between the couple filming and close ups of the rhino, captures something of their style:

> 'I never feel at ease on foot approaching a rhino in open country with no protection whatever in case of a charge. A lot of people have got killed that way. I signal to Michaela, 'This is not the long horn Gertie. Let us go.' Oh yes, Michaela wants at least one more picture. At last, to my relief, we're on our way back and when we least expect it a long pointed incredibly sharp forward pointing horn emerges from behind a bush. We've no time to hide, we are at work taking pictures. This is Gertie all right – at last, the legendary Gertie, the most abnormal and freakish rhino horn we have ever seen. She sighs. She is aware of us, but she continues undisturbed'.

The Denis' films were bought in by the BBC and edited for transmission by producers at Bristol. Over 89 programmes were transmitted with series like *Filming wild Animals* and *On Safari* running until 1968. Records suggest they were popular with the public: audience shares range from 5-13% and audience' indices span 65 to 80 to levels still considered good for natural history films[84]. Their broadcast hours were accounted in total programme output advancing the productivity of producers in Bristol with controllers in London[85]. For the BBC producers buying in existing safari films provided access to an established genre of programme making able to overcome the technological restrictions for filming animals. Animals were relatively easy to film in the open spaces of the African Serengeti; many African mammals are active during the day so filming can take place in good light and game wardens provided access to known haunts of key charismatic animals. These were clearly important films within the broadcasting context of the 1950s.

However, they were also criticised. Chris Parsons suggests the series were 'embarrassingly expensive' and required 'a lot of post-production support' to edit into appropriate length and style for broadcast on the BBC[86]. He also records concern about their content. 'Some of us were uneasy about the Unit being responsible for the Denis series [...] It was undeniable that Armand and Michaela Denis were very popular with viewers and their films frequently contained excellent animal behaviour footage from Africa; but their personality double act - with alternating commentary - together with their 'pets' in the warden's garden routine made some of us uneasy'[87]. Despite their 'undeniable' popularity and their financial value, they were never central to the way members of the Unit defined their identity. Their programme output and audience ratings supported the productivity required for a unit, but unease with their vision of nature means they are marginalised in histories of the Unit's formation.

Explanation can be drawn from the narratives, locations and style of filming in these programmes. The Denis' films were located in environments closely associated with the Victorian pursuit of zoological specimens through hunting[88] and the inter-war focus on reserving nature for the preservation of game animals[89]. The flamboyant and ritualistic hunting with a camera they present was difficult to reconcile with capturing animals on film for the purposes of supporting a modern science of animal behaviour. In their films the camera was positioned within a technological matrix that includes other accoutrements of the safari such as jeep and gun; and the conduct of Armand and Michaela Denis assert the association of filming with the invasive practices of hunting. The camera's location within a particular hunting nature-culture devalued its status as a scientific instrument, and destabilised the associations with a scientific vision programme makers were attempting to forge.

The view from the zoo

The 1950s also saw a proliferation of television programmes showing animals in zoos and studios. The zoo was an obvious site for early wildlife programmes through which captive animals could be incorporated into television programmes through outside broadcast technology. Access to all manner of animals could be guaranteed within the zoo and 'you could get a signal either into a Post Office or telephone wires or by the radio dish'[90] to transmit the images live. This opportunity was widely exploited. The BBC unit for the production of television features in London produced *Looking at Animals* and *All about Animals* with George Cansdale. David Attenborough presented a series of *Zoo Quests* (1954-1961) from London studios, interspersing film footage of zoo collecting trips with studio footage, which introduced the animals close up. In Bristol *News from the Zoos* (1959) was presented by James Fisher from a series of European zoos; with *World Zoos* (1961) later extending this format. When ITV transmissions began in 1955, Granada built a studio within London Zoo where they presented *Zoo Time* with Desmond Morris. Perhaps the best known programme of this type was *Animal Magic* presented by Johnny Morris from Bristol Zoo in Clifton. This was to be one of the longest running series for the NHU, transmitted for 21 years, from 1962 to 1983.

[Approx. position image 3]

The format of these programmes varied, but all featured zoo staff and broadcasters presenting animals within zoo enclosures and studios, and most did make 'good' television. As David Attenborough reflects, 'each week the curator of London Zoo brought a different animal into the studio and put it on a mat. It wasn't much fun for the animals who were plonked under the arc lights, but it was fairly apparent it was good television. The creatures would bite the curator, or relieve themselves down his jacket or escape and need to be chased around the studio'[91]. Broadcasting from the zoo or studio meant programme makers were able to share the visual appeal of exotic animals at the zoo[92]. Television programmes also innovated on the spectacle offered by zoos through showing presenters actually

interacting with the animals. This tactile encounter with animals is promised at the zoo, where the real event is the physical presence of the animals themselves[93], and zoos do offer opportunities for direct human animal interaction, through animal rides, demonstrations, children's zoos and public feeding. However, presenters, such as Johnny Morris, a radio comedian rather than naturalist, were able to narrow further the gap between audience and animals. In his performance as zookeeper, Morris touched and interacted with all manner of animals, shifting back and forth between his own commentary and comic voice-overs for the animal's thoughts and conversations, giving voice, character and identity to the animals themselves.

Zoo programmes did become popular staples of wildlife television throughout the 1950s and 1960s, but their use became increasingly restricted to the lower budget and production values of children's television[94]. The presence of the studio, cameras and people at the zoo, and the light and heat of filming meant 'natural' animal behaviour could not be captured. The interpretations of animal behaviour chosen by presenters like Johnny Morris again created unease at the NHU; at worst they were seen as sentimental and unscientific anthropomorphism, at best populist. As Chris Parsons recalls 'his anthropomorphism offended some people, but I considered this a fair price to pay if we were able to reach viewers who did not normally watch *Look*'[95]. There was also increasing reluctance from zoos to be involved with this form of television. George Cansdale, presenter of *Looking at Animals* and *All About Animals* and superintendent of London Zoo from 1948 to 1953, was one of the first casualties of this shift. In 1953 he was sacked by the council of the London Zoological Society and his job divided between separate departments, reputedly because academic experts and officials at the zoological society disapproved of his television appearances in which he was seen playing with and cuddling all sorts of animals[96].

Natural history programmes from the zoo were located within a complex and ideologically ordered space associated with Victorian developments in taxonomy[97]. Television had innovated on this view of nature through taking outside broadcast cameras into the backstage of these places of science, featuring footage of animals out of zoo opening hours, exhibiting unfamiliar behaviour in the studio, or interacting with people and celebrating a tactile experience of animals. The tactile interaction and subjective interpretation of animals presented by Johnny Morris and George Cansdale clashed with the scientific ambitions of men at the Royal Zoological Society and caused discomfort to filmmakers in Bristol. As Birke suggests 'objective detachment is [...] stereotypically masculine in our culture [...] to identify with animals (a more 'feminine' position) is to cease to be objective'[98]. This presentation of animals and people contradicted the modernisation of animal studies sought by zoo administrators and broadcasters, positioning the camera as a means of extending the spectacle of the least scientific parts of the zoo experience. This was acceptable for informing children about nature – with its long history of anthropomorphism – but inappropriate for a mature vision of modern natural history television. Emphasis was placed instead on the third strand of wildlife broadcasting, involving a different form of interaction with animals and drawing upon associations between naturalists and filmmakers.

A programme of science and observation

The third strand of natural history filmmaking incorporated film footage of animal behaviour into the conventions of the naturalist's lecture. Starting with a number of experimental broadcasts from May 1953, *Look* was shaped into a series in August 1955 and ran for fifteen years until 1969. *Look* was distinctively subtitled 'a programme of science and observation'[99] which differentiated it from entertaining antics at the zoo or romantic wildlife adventures. This was an approach pioneered by the Bristol producer Desmond Hawkins, as he describes:

> ‘I suppose the aims I had were to break away from the old sort of anthropomorphic ‘Dear Mr and Mrs Blackbird’ kind of journalism, you know, that we had before. What I flew at my masthead were the words “science and observation”. A programme of science and observation was what we tried to do. If you recall how much of television had been zoo animals, animals in studios, there was no doubt that you were being taken into the wild, that nothing was rigged or cheated and this was a tremendous advantage of course’[100].

Look aimed to take viewers out of the studio, shunning the showmanship of ‘hunting with a camera’, to show people a vision of nature untouched by humans emerging from the work of amateur naturalist filmmakers and animal behaviour studies.

[Approx. position of Image 4]

Look was broadcast live from the studios in Bristol and presented by Peter Scott. At the start of each programme Scott appeared seated behind his desk in a mock up of the naturalist’s study, surrounded by maps, charts, microscopes, field glasses, and drawing boards; props through which he would guide the viewer into new scientific perspectives on animal worlds. In the early programmes he would then move over to the sofa to meet his guest and maker of the film they were to introduce, watch and discuss. Removing the film from the can, placing it in the projector and cranking the handle, the screen would flicker into life introducing the latest footage of previously unseen animal behaviour. This programme format drew upon existing film footage, combining it with the demands of a live broadcast in the studio, where Scott held the programme together through his discussions with invited experts and drawings in the manner of a television lecture. Scott explains the evolution of this format in his memoirs:

> ‘The pattern of the lecture was a short preliminary talk with drawings and a map followed by the first reel of film. There was then a short pause while the film reels were changed, during which I progressed the story with more drawings; finally at the end of the second reel of the film there was a brief conclusion. This technique was obviously capable of extension; so that instead of two reels one might have three or four sections of film with spaces for discussion in between them. This would then become more like a lantern slide lecture, but with film inserts instead of slides. Thus was the framework of the television lecture with film established.’ [101]

There were few resources to commission these short films. Producers at Bristol worked around these constraints by relying on the skills of amateur naturalist filmmakers and scientists already filming animal behaviour. They used personal and professional networks to find people, often of private means, who had the time, skill and enthusiasm to extend the medium of wildlife photography from still to moving pictures[102]. As Tony Soper explains, ‘we had to find film for these programmes. And we used to telephone round to Peter Scott's friends, to people like Eric Hosking, Lord Alanbrooke, people like that. Anyone who'd got an amateur film camera and did bird films in their holidays mostly’[103]. Pioneering filmmakers like Heinz Sielmann followed the work of Lorenz, rearing wild animals in near naturalistic conditions to observe and film their behaviour. Ernest Neal and Eric Ashby specialised in habituating mammal populations to obtain images of badgers and other British mammals. Other filmmakers used field skills developed in the pursuit of animals and birds in the practices of European wildfowling to approach animals unseen. Further film was taken directly from ethological studies: Huxley's material of gannets, Fisher's of fulmars and Tinbergen's of herring gulls. Their aim was to inscribe a view of animal behaviour in the field apparently undisturbed by human intervention[104]. These early films were rarely made with the primary purpose of transmission on television, and many of them showed no

concessions to the demands of their new medium of broadcast. Sequences would be shot from one perspective, often featuring birds on the nest where their appearance could be assured, and transmitted with little editing. The emphasis of the filmmakers was 'taking' images of animals rather than 'making' complete films. However, it was these films featuring natural animal behaviour captured in the field, their narratives, locations and filmmaking practices on the boundaries between television and science, which were most actively supported by pioneering natural history filmmakers.

The public science of *Look* supported the construction of the field as a site for the study of animal behaviour and the camera as a scientific method of recording animal movement. The presentation of film footage within the naturalist study affirms the authority of the camera as a scientific device with a status similar to the charts, maps and field glasses, which surround Scott. The presentations of Scott differ from the anthropomorphic humour of Armand and Michaela Denis or the close identification with animals of Johnny Morris. His performance of the trustworthy, gentlemanly identity of the naturalist reinforces his position as a credible spokesperson for science[105]. His introductions to the films structure the programme in the manner of a scientific text, 'a visual set of inscriptions produced by the instrument and a verbal commentary uttered by the scientist'[106]. Television programmes were able to make links between field, film and the practices of science that were difficult to achieve within the textual form of scientific articles. Their techniques of film montage cut between the empirical and abstract; 'the world of visible organisms and the unseen structures of information proposed in the theoretical model are seamlessly linked, literally in one line'[107].

The legitimacy of these recordings of animal behaviour is further underlined by the processes and locations of filming. The animal's image is captured, but since the presenter stands outside of the film no power is seen exercised over the animal. The naturalist filmmaker looks, but unlike the hunter or the zookeeper, does not touch and the images

produced are thus able to transcend the moment of recording, universalised as natural behaviour. The camera constructs a landscape in which animal behaviour can be witnessed, but which is empty of human disruption. Without visible evidence of the complex connections between humans and animals in the urban zoo or the construction of exotic wilderness of east Africa, such sites could be coded as places for the professionalisation of a modern biological science and as appropriate spaces for forging a new forward looking language for natural history television. Scientists and filmmakers were brought together by the shared practices of detached observation, reinforcing the scientific status of ethology and realising filmmakers' vision for public natural history. However, this was not a popular science, and its vision of nature also divides. The public presentations of ethological science in *Look* reinforced 'the critical boundary between watching and witnessing, between who is a scientist and who is not, and between popular culture and scientific fact'[108]. The move away from images of animals at the zoo, where animals could be seen interacting with presenters, meant the spaces where viewers could see themselves within natural history programmes were devalued. With the subsequent disappearance of Armand and Michaela Denis from screens it would be many years before women were again fronting natural history programmes as credible spokespersons for animal behaviour. The stunning sequences of natural history behaviour in *Look* presented a view of nature only available to the specialist naturalist, ornithologist or filmmaker. While natural history audiences could enjoy these, they were not experiences they could empathise with or seek for themselves.

The filming techniques and format pioneered by *Look* provided many successful films in the 1950s and 1960s for the NHU. Natural history footage from further afield was shown in *Look* and *Faraway Look*, often featuring specially commissioned material from increasingly professional wildlife cameramen like Sielmann, Ron Eastman and Roger Jackmann. The academic format of natural history was developed in the series *Life*, presented by Desmond Morris, a former student of Tinbergen. There were collaborations with organisations like

Oxford Scientific films, linked to Tinbergen's Oxford programme of ethology, who were influential in developing high magnification wildlife films for the study of insect behaviour. During the late 1950s producers at Bristol decided they could no longer use material filmed by naturalists or scientists with no concessions to television, concluding 'we should tailor our films to suit the medium'[109]. As Chris Parsons observed, 'I was saddened by the realisation that this was probably the last time we would be able to use this great man's work [Viscount Alanbrooke], for his interest was in *taking* film of birds rather than *making* films about birds'[110]. However, the ethos of detached observation, field studies and scientific vision in programmes like *Look* and the associations between filmmaking and science forged were taken forward into core definitions of the Unit for natural history filmmaking at the BBC. They still endure in discussions at the NHU today, supporting the lingering public service broadcasting remit of the BBC, and upholding a commitment to naturalism, the key to authority of this natural history form. As one of the longest serving members of the Unit suggested to me:

> 'We've always had a good relationship with the scientific world. [...] And therefore, there was a sense of integrity, about our films which hopefully, you know, is not too badly strained even today. We haven't been making fairy stories. We haven't been making Disney films.'[111]

Conclusion

These three programme formats, transmitted concurrently, represent different points of intersection between the worlds of post-war television and natural history, entertainment and science. All are innovative responses to the challenge of finding places for filming animals in early television, and all play an important role in establishing multiple resources for the institution of a designated Unit for natural history presentations. Yet not all are privileged as

places for constructing new knowledge about animals in post-war natural history. Their narratives of nature, science and adventure bisect attempts publicly to warrant the science of ethology and the moral values of field observation. Their location within the national parks of East Africa, the zoo and field are sites shared in the search for appropriate ways of filming animals for television programmes and studying animal behaviour. Each film location has a distinct geography involving different configurations of filmmaker, broadcaster, scientist, and animal, and constitutes a particular 'culture of nature'[112]. Different techniques of filming are used to incorporate images of animals into the worlds of television only one of which constructs a credible spokespersons for nature in the practices of early ethology. The camera and film act as boundary objects between these practices, tying together diverse interests within these sites. Both the representational practices of television and science are important in understanding how certain films became both research tool and structuring metaphor in the production of animal behaviour research and the formations of early natural history television. Only the practices and presentations of public science in programmes like *Look* are capable of bringing together the diverse desires of filmmakers and ethologists.

Through appeal to new forms of communication in the mass media a vision of nature could be simultaneously professionalised and popularised. Early ethologists look to the media to legitimate and support their science of animal behaviour study. By positioning animal films as a way of moving between detached observation in the field and the public realms of science, a scientific view of animal behaviour could be universalised: the media 'publicly warranting that the knowledge produced in such places was reliable and authentic'[113]. The status of the field as scientific site and the use of film to move from field to study are mutually constituted – to establish a scientific identity for the field and the camera as an instrument of field science requires publicly attributing objective ideals to both at the same time[114]. The need to legitimate the scientific credentials of these concurrently is a driving motivation for the ethologist's appeal to the public, outside of the normal channels of

science. The BBC had established a reputation for educational programming, and with prior experience of natural history radio offered institutional veracity to their presentations of animal life: 'institutions play a crucial role in formulating boundary objects which allow for stable translations'[115]. At Bristol they found a group of filmmakers who shared their ethic of close detachment and observation for nature, the moral value of field experience, and a scientific and educational vision for the television camera. Producers at Bristol had come into natural history filmmaking, marginalised from the cultures of London broadcasting or seeking refuge from the increasingly mechanical objectivity demanded by molecular biology. In their desires to institute a unit for natural history filmmaking they were prepared to draw upon a range of television genres to fill schedules and support audience ratings, but consistently sought to formalise an ethos around ethological metaphors for understanding animal behaviour. The collaboration was mutually beneficial to the personal and professional satisfaction of individuals inhabiting both worlds.

The meanings attributed to these films and the purposes intended in their transmission differed, and were progressively to diverge from the late 1950s onwards. However, their narratives of nature form the basis of the productive collaboration between scientists and filmmakers that has permeated the development of natural history filmmaking in Britain. The analysis offered here suggests this association supported the nature of the field as a scientific research site. It furthers recognition that the field is best understood as a heterogeneous and porous domain of scientific activity, involving multiple negotiations of many kinds between professionals and amateurs, by extending this analysis to include role of television natural history films. Analysis of these programmes as boundary objects deepen our understanding of how film simultaneously manages to advocate the primacy of experience, whilst successfully excluding popular experiences and other knowledges of nature. Through exploring these relations from the perspective of the media, this paper has suggested that visualisations of nature are not simply pioneered in an expert realm to be

picked up and popularised in the public sphere. The technologies, locations, rhetorics and institutional associations of competing visions of nature both define and recreate boundaries between expert and popular understandings of the natural world. Non-scientific institutions play an important role in the practices of knowledge making, shaping the geographies of both scientific and popular knowledge production. Geographers have much to contribute to exploring the plural and contested sites involved in the making of science, tracing how diverse contexts and situations traditionally located 'outside' scientific work are articulated within it. Whilst historians and sociologists of science are increasingly attending to the articulation of science with its public dimension, less well observed are the struggles over these forms of expertise within the contested spaces of popular culture. This paper has been concerned to chart the dynamics between scientific and popular forms of knowledge within early natural history filmmaking, but many of the cultural spaces of post-war television and science remain to be explored.

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Notes on Images

Image 1.

Description: Desmond Hawkins and Peter Scott in the field with microphone

Caption: Desmond Hawkins interviewing Peter Scott for *The Naturalist*, 1947 (Copyright, BBC Natural History Unit)

Image 2.

Description: The Denis' on the front cover of Radio Times

Caption: Armand and Michaela Denis on the front cover of the *Radio Times*, advertising their series *Safari to Asia*, 3rd December 1960 (Copyright, BBC Natural History Unit)

Image 3.

Description: BBC camera and presenters at the zoo

Caption: James Fisher with Bob Veerasawmy, and a South American porcupine at Paignton Zoo, filming with an outside broadcast electronic camera for *News from the Zoos*, 22nd July 1959 (Copyright, BBC Natural History Unit)

Image 4.

Description: Peter Scott on his own in the field with camera and field glasses

Caption: Peter Scott on location with the Kodak camera he used to shoot his lecture films, which featured in many of the early editions of *Look* (Copyright, BBC Natural History Unit)

[1] C. Parsons, *True to nature: Christopher Parsons looks back on 25 years of wildlife filming with the BBC Natural History Unit*, (London, Patrick Stephens, 1982), p. 58.

[2] *Ibid*., p. 173.

[3] *Ibid*., pp. 173-4.

[4] *Ibid*., p. 90.

[5] J. Murdoch, 'Inhuman/nonhuman/human: actor-network theory and the prospects for a nondualistic and symmetrical perspective on nature and society', *Environment and Planning D: Society and Space* 15 (1997), pp. 731-56; S. Whatmore 'Hybrid geographies: rethinking the 'human' in human geography' in D. Massey, J. Allen, and P. Sarre, eds., *Human geography today* (Oxford, Polity Press, 1999), pp. 22-39.

[6] See for example J. Murdoch, 'Towards a geography of heterogeneous associations', *Progress in Human Geography* 21 (1997), pp. 321-37; D. Livingstone, 'The spaces of knowledge: contributions towards a historical geography of science', *Environment and Planning D: Society and Space* 13 (1995), pp. 5-34; N. Thrift, F. Driver and D. Livingstone, 'The geography of truth', *Environment and Planning D: Society and Space* 13 (1995), pp. 1-3; S. Shapin, 'Placing the view from nowhere: historical and sociological problems in the location of science', *Transactions of the Institute of British Geographers* 23 (1998), pp. 5-19.

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[11] S. Shapin, 'Science and the public' in R. C. Olby, ed., *Companion to the history of modern science* (London, Routledge, 1990), p. 1001.

[12] T. Gieryn, 'Boundary-work and the demarcation of science from non-science: strains and interests in professional ideologies of scientists,' *American Sociological Review* 48 (1983), pp. 781-95; T. Gieryn, *Cultural boundaries of science* (Chicago, Chicago University Press, 1999).

[13] S. L. Star and J. R. Griesemer, 'Institutional ecology, "translations" and boundary objects: amateurs and professionals in Berkeley's museum of vertebrate zoology, 1907-1939', *Social Studies of Science* 19 (1989), pp. 387-420.

[14] Gieryn, 'Boundary-work and the demarcation of science from non-science', p. 782

[15] For example, whilst publics may be important to the constitution of a field of enquiry as a scientific realm, once established the public legitimation of science begins to rest precisely on its autonomy from public questions.

[16] F. Turner, 'Public Science in Britain 1880-191' *Isis* 71 (1980), pp. 589-608; T. Gieryn, G. Bevins and S. Zehr, 'Professionalisation of American scientists: public science in the creation evolution trials', *American Sociological Review* 50 (1985), pp. 392-409*;* in Geography see C. Withers, 'Towards a history of geography in the public sphere', *History of Science* 37, 115 (1999), pp. 45-78.

[17] Turner, 'Public science in Britain', pp. 589-90.

[18] Shapin argues 'the differentiation and specialisation of science […] created an opportunity for the explicit 'popularisation' of science, and thus, for literary forms designed to convey otherwise inaccessible or impenetrable scientific knowledge to sectors of the public', Shapin, 'Science and the public', p.1001.

[19] R. Barton, 'Just before nature: the purposes of science and the purposes of popularization in some English popular science journals of the 1860s', *Annals of Science* 55, 1 (1998), pp. 1-33.

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[21] *Ibid.*, p.22-3.

[22] A. Holmquest, 'The rhetorical strategy of boundary work' *Argumentation* 4 (1990), pp. 235-58.

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[26] The work of Tucker on scientific claims in the context of Victorian ballooning considers popular culture as a competitive field where 'scientists had to work against – or redirect – stereotypes of discoverers and explorers to fashion a credible identity for themselves'. J. Tucker, 'Voyages of discovery on oceans of air: Scientific observation and the image of science in an age of "balloonacy"' *Osiris* 11, (1996) p. 175.

[27] Thrift et al, 'The geography of truth', p.2.

[28] Shapin, 'Placing the view from nowhere', p. 8, writes 'A trust relationship is central to the very idea of empirical science [and] that relationship is inscribed in space: those who have not seen these things know them by trusting those who have'.

[29] H. Kuklik and R. Kohler, 'Science in the field', *Osiris* 11 (1996); N. Jardine, J. A. Secord, and E. C. Spary, eds., *Cultures of natural history* (Cambridge, Cambridge University Press, 1996).

[30] H. Kuklik and R. Kohler, 'Introduction', *Osiris* 11 (1996), p. 1-14.

[31] R. W. Burkhardt, 'Ethology, natural history, the life sciences, and the problem of place', *Journal of the History of Biology* 32, 3 (1999), 489-508; see also D. Outram, 'New spaces in natural history', in N. Jardine, J.A. Secord, and E. C. Spary, eds., *Cultures of natural history*, pp. 249-265.

[32] See also Secord, 'Science in the pub'.

[33] Star and Griesemer, 'Institutional ecology', p.393.

[34] *Ibid*.

[35] *Ibid*., p. 408.

[36] B. Latour, *Science in action: how to follow scientists and engineers through society* (Cambridge, Cambridge University Press, 1996).

[37] B. Winston, 'The documentary film as scientific inscription', in M. Renov, ed., *Theorizing documentary* (London, Routledge, 1993), pp. 37-57.

[38] D. Haraway, *Primate visions: gender, race and nature in the world of modern science* (London, Routledge, 1989); G. Mitman, 'Hollywood technology, popular culture and the American Museum of Natural History', *Isis* 84 (1993), pp. 637-61.

[39] G. Mitman, 'When nature is the zoo: vision and power in the art and science of natural history', *Osiris* 11 (1996), pp. 117-143.

[40] Mitman, 'Hollywood technology', p. 639.

[41] Haraway, *Primate visions*, p. 44.

[42] *Ibid*.

[43] Television transmission in the UK had begun in 1922; however, television broadcasting was abandoned during the war since it was thought the transmitter at Alexandra Palace would act as a target for the bombing of London.

[44] P. Marren, *The new naturalists* (London, Collins, 1995).

[45] J. Sheail, *Nature in trust: the history of nature conservation in Britain* (Glasgow, Blackie, 1976); J. Sheail, 'War and the development of nature conservation in Britain', *Journal of Environmental Management*, 44 (1995), pp. 267-283.

[46] D. Matless, 'Visual culture and citizenship: England in the 1940s', *Journal of Historical Geography* 22, 4 (1996), p. 433.

[47] See Marren, *The New Naturalists.*

[48] *Ibid*., p. 21.

[49] Haley liked to use the image of British society as a cultural pyramid slowly aspiring upward, with the BBC acting as the lever that activated this progressive upward movement. Quoted in K. Kumar, 'Holding the Middle Ground: the BBC, the public and the professional broadcaster', in J. Curran, M.

Gurevitch and J. Woollacott, eds., *Mass communication and society* (London, Edward Arnold, 1977), p.246.

[50] J. Cain, *The BBC: 70 years of broadcasting* (London, BBC Publications, 1992).

[51] Parsons, *True to nature*, p. 27

[52] *Ibid*.

[53] Television had only one-tenths the funding of radio. In 1950 the television signal only covered 33-50% of the British population, focused on London, the South East and six other major cities, and broadcasting was limited to 30 hours a week. By 1953 only around 1 million television licences had been sold at a cost of £1 each. Cain, *The BBC*, p. 63.

[54] Parsons, *True to nature*, p. 27. For example television news began simply as a reading of the news with no presenter in vision; pictures did not accompany news bulletins until July 1954. Cain, *The BBC*, p. 64.

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[58] W.H. Thorpe, *The origins and rise of ethology*, (London, Heinemann, 1979).

[59] A. Bramwell, *Ecology in the twentieth century* (London, Yale University Press, 1989).

[60] On the importance of the visual in the study of ethology, Mitman writes that 'Lorenz and Tinbergen developed a theoretical framework for animal behaviour that centred on animal posture and visual display as signs of stimuli that triggered innate releasing mechanisms in organisms'. Mitman, 'Hollywood technology', p. 652.

[61] Dewsbury suggests that ethologists and comparative psychologists came into direct conflict in 1953 through an exchange over Konrad Lorenz's theory of instinctive behaviour. Dewsbury, 'Rhetorical strategies in the presentation of ethology'.

[62] K. Vernon, 'Desperately seeking status: Evolutionary Systematics and the taxonomists' search for respectability 1940-60', *British Journal for the History Science*, 26 (1993), pp. 207-27.

[63] Dewsbury, ''Rhetorical strategies in the presentation of ethology'.

[64] As Bramwell observes 'the idea that animal behaviour could be understood by close observation in the wild found opposition. It was difficult to carry out controlled experiments in these conditions'. Bramwell, *Ecology in the twentieth century*, p. 41.

[65] See for example K. Lorenz, *King Solomon's ring: new light on animal ways* (London, Methuen, 1952); N. Tinbergen *Curious naturalists* (London, Country Life, 1958); N. Tinbergen, 'The field is our laboratory', *Country Life* 110, 9 (1951) pp. 70-2.

[66] Parsons, *True to nature*, p. 259.

[67] E. Hall, 'A conversation with Nobel Prize winner Niko Tinbergen' *Psychology Today* 7 (1974), p. 66.

[68] H. van Rappard, 'Book Review: The world of instinct - Niko Tinbergen and the origin of ethology in the Netherlands 1920-1950 by D. R. Roell', *Journal of the History of the Behavioural Sciences* 34, 1 (1998) pp. 63-65.

[69] Dewsbury, 'Rhetorical strategies in the presentation of ethology'. See also D. Dewsbury, 'Comparative psychology and ethology – a reassessment', *American Psychologist* 47, 2 (1992), pp. 208-15; D. Dewsbury, 'Americans in Europe: the role of travel in the spread of European ethology after World War II', *Animal Behaviour* 49, 6 (1995), pp. 1649-63.

[70] For a discussion of this book in English see Rappard, 'Book Review'.

[71] D. Hawkins, *When I was: a memoir of the years between the wars* (London, Macmillan, 1989).

[72] Parsons, *True to nature*, p. 52.

[73] This extract is from an undated, unsourced article on Eric Hosking in the Natural History Unit archives.

[74] John Sparks, Series Producer Natural History Unit, interviewed 13.6.95.

[75] David Attenborough, quoted in J. Burgess and D. Unwin, 'Exploring the *Living Planet* with David Attenborough', *Journal of Geography in Higher Education*, 8 (1984), p. 112.

[76] Parsons, *True to Nature*, p. 26.

[77] For a full filmography of BBC natural history films from 1953 to 1995 see G. Davies, *Networks of nature: stories of natural history filmmaking from the BBC*, (University of London, unpublished Ph.D. thesis, 1998).

[78] J. Ryan, *Picturing empire : photography and the visualization of the British Empire* (London, Reaktion Books, 1997); J. MacKenzie, *The empire of nature: hunting, conservation and British imperialism* (Manchester, Manchester University Press, 1988).

[79] This form of filmmaking retains the characteristics of a hunt without harm to the animal, as Roosevelt suggests, 'the chief attractions lie in the physical hardihood for which the life calls, the sense of limitless freedom which it brings, and the remoteness and wild charm and beauty of primitive nature. All of this we get exactly as much in hunting with the camera as in hunting with the rifle'. Quoted in P. Schmitt, *Back to nature: The arcadian myth in urban America* (New York, Oxford University Press, 1969), p. 146.

[80] quoted in Ryan, *Picturing empire*, p.137

[81] *Ibid*.

[82] R. Neumann, R. (1995) 'Ways of seeing Africa: colonial recasting of African society and landscape in Serengeti National Park', *Ecumene* 2 (1995), pp. 149-69; R. Neumann, 'Dukes, earls and ersatz Edens: aristocratic nature preservationists in colonial Africa', *Environment and Planning D: Society and Space* (1996), pp. 79-98.

[83] This extract is taken from *Search for Gertie* Post production script (NHU library, transmission date 1958).

[84] Audience measures where introduced following the advent of ITV which put pressure on the BBC to compete with the ITV companies for a respectable audience share to support its statutory fee. The BBC's audience research department was introduced after 1955 to monitor the number of people who had seen a programme, counting in total those who had watched more than half of a given programme. They also established a numerical code or percentage indices for measuring audience appreciation, using structured questionnaires to gauge how educational and interesting the audience found each programme.

[85] Parsons, *True to nature*, p. 70.

[86] *Ibid*., p. 72.

[87] *Ibid*.

[88] Ryan, *Picturing empire*, p. 99.

[89] Neumann, 'Dukes, earls and ersatz Edens'.

[90] John Sparks, Series Producer Natural History Unit, interviewed 13.6.95.

[91] Quoted in an interview with David Attenborough in *The Independent Magazine* (29th September 1990), p.48.

[92] J. Berger, 'Why look at animals' in J. Berger, *About looking* (London, Writers and Readers, 1980), pp. 1-26.

[93] S. Montgomery, 'The zoo: theatre of the animals', *Science as Culture* 4 (1995), pp. 565-600.

[94] From the end of Animal Magic in 1982 until the animal hospital and zookeeper documentaries in the mid 1990s, zoos ceased to feature on television as places of entertainment or amusement, with programmes on animals in the zoo more typically taking a campaigning or critical stance. See for example *Zoo 2000* transmitted in 1984, and the *State of the Ark*, produced by features in London in 1986. One exception to this was a 1987 live broadcast from the zoo, called *Zooweek*, and produced in the peak of the BBC's experiments with the short regular visits to outside broadcast locations in the live watch format.

[95] Parsons, *True to nature*, p. 103.

[96] *The Guardian* 'The man from the Zoo: An obituary of George Cansdale', (26th August 1993)

[97] K. Anderson, 'Culture and nature at the Adelaide Zoo: new frontiers in "human" geography', *Transactions of the Institute of British Geographers*, 20 (1995), pp. 275-95; R. J. Hoage and W. A. Deiss, eds., *New worlds, new animals: from menagerie to zoological park in the nineteenth century*, (London, John Hopkins University Press, 1996).

[98] Quoted in B. Crowther, 'Towards a feminist critique of television natural history programmes', in P. Florence and D. Reynolds, eds., *Feminist subjects: multi media* (Manchester, Manchester University Press, 1995), pp. 136-7.

[99] D. Hawkins, quoted in Post Production Script *Wildlife Jubilee*, produced by George Inger and Peter Bale (BBC Natural History Unit Library, transmission date 1982).

[100] Desmond Hawkins, quoted in post production script *TV50 Natural History*, written and presented by Desmond Morris, produced by Sue Bourne (BBC Natural History Unit library, transmission date 1986).

[101] P. Scott, *The eye of the wind*. (London, Hodder and Stoughton, 1961), p.601.

[102]An anniversary programme made to celebrate the twenty-first edition of the series introduces the people and animals involved in these early film sequences. Transmitted at 7.50pm on 23rd of May 1956 with the title *The Twenty First*, the programme opens with scenics from Peter Scott's footage of Iceland and his film of birds including phalaropes and limpkins; then more familiar seals; Heinz Sielmann's pioneering footage of woodpeckers; and swans, flamingos and storks. Footage of mammals revealed hamsters, pine martins, polecats and koala bears. Further film of birds showed penguins, gannets and golden eagles. Other families of animals were represented by frogs and swallowtail butterflies. These short film extracts were counterpoised by cuts to discussions with Peter Scott in the studio. The closing credits introduce the early filming sources, listing film sequences by: Field Marshal Viscount Alanbrooke, Australian News and Information Bureau, Dick Bagnall-Oakley, BBC Film Unit, Sir Geoffrey de Havilland, Walter Higham, H. G. Hurrell, G. T. Kay, Captain C. W. R. Knight, Bernard Kunicki, Roger Tory Peterson, RSPB Film Unit, Peter Scott, Heinz Sielmann, William Sladen and G. K. Whitehead. The programme's film editor was Christopher Parsons and the programme produced by Brandon Acton-Bond. Post Production Script *Look No 21: The Twenty First*, introduced by Peter Scott and Desmond Hawkins, produced by Brandon Acton Bond (BBC Natural History Unit Library, transmission date 1956).

[103] Tony Soper, quoted in Post Production Script *Wildlife Jubilee*, produced by George Inger and Peter Bale, (BBC Natural History Unit Library, transmission date 1982).

[104] A hunting history was clearly still important to some individuals: 'This involved achieving the power of death over the quarry without exercising it [...] This advance was no sudden change in my outlook. I was still too much captivated by the ritual aspects of wildfowling to give it up altogether. So many things went with the actual shooting - the beauty, the natural history, the exercise, the memories, and particularly the technical skills which in the course of years I had acquired'. Scott, e*ye of the wind*, p. 173.

[105] Shapin, 'Placing the view from nowhere', p.8.

[106] Latour, *Science in action*, p. 71.

[107] G. Myers, 'Every picture tells a story: illustrations in E.O. Wilson's Sociobiology' in M. Lynch and S. Woolgar, eds., *Representation in scientific practice*, (London, MIT Press, 1990), p. 261.

[108] D. Haraway, *Modest_witness@second_millenium.femaleman©_meets_oncomouse ™: feminism and technoscience* (London, Routledge, 1997), p. 33.

[109] Parsons, *True to nature*, p. 46.

[110] *Ibid*., p. 65, original emphasis.

[111] John Sparks, series producer Natural History Unit, interviewed 13.6.95.

[112] D. Matless, 'Moral geography in Broadland', *Ecumene* 1 (1994), pp. 127-55.

[113] Shapin, 1988, quoted in Livingstone, 'The spaces of knowledge', p. 21.

[114] Anecdotal evidence suggests this achievement cannot be taken for granted. The Collins *New Naturalist* series had pioneered the extensive use of modern photographic techniques in the production of their popular field guides to natural history. However, other natural history field guides were very slow to adopt such new techniques, suggesting the camera took a long time to be accepted as the main form of scientific form of animal representation. The first Audubon field guide to use photographs of birds rather than paintings and drawings was not issued until 1977. B. Winston 'documentary film', p. 39.

[115] F. Harvey and N. Chrisman, 'Boundary objects and the social construction of GIS', *Environment and Planning A* 30 (1998), p. 1687.