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Making science at home: visual displays of space science and nuclear physics at the Science Museum and on television in postwar Britain

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The public presentation of science and technology in postwar Britain remains a field open to exploration. Current scholarship on the topic is growing but still tends to concentrate on the written word, thus making theorizing, at this stage, difficult. This paper is an attempt to expand the literature through two case studies that compare and synthesize displays of scientific and technological knowledge in two visual media, the Science Museum and television, in the 1950s and 1960s. The topics of these case studies are space exploration and nuclear energy. The thesis this paper explores is that both media fleshed out strategies of displays based on the use of categories from everyday life. As a result, outcomes of large-scale public scientific and technological undertakings were interwoven within audiences' daily life experiences, thus appearing ordinary rather than extraordinary. This use of symbols and values drawn from private life worked to alleviate fears of risk associated with these new fields of technological exploration and at the same time give them widespread currency in the public sphere.

Keywords: public culture of science, visual display of scientific knowledge, Science Museum, science television, BBC, space exploration, nuclear energy

Introduction

Scholarly exploration of science and technology in the cold war period has recently begun to look anew to its topic as 'a varied set of concepts, practices, technologies, social and institutional relationships, values, ideologies, and more'[1]. This re-examination, however, has so far yielded very little about the fine texture of their representation within public culture. It is the contention of this paper that only by beginning to address this absence from the literature will we be able to untangle the web of values and beliefs in which 'science' and 'technology,' as categories encompassing a sum of artifacts, individuals, institutions and practices, are suspended in the context of the larger social totality. This web of values and beliefs is what is meant in what follows by the phrase 'public culture of science.'

How, then, can we begin to grasp the texture of the public presentation of science and technology in Britain in the two decades following the Second World II? This paper examines side-by-side displays at the Science Museum in London and in television programs during the 1950s and the 1960s. It explores the following thesis: that both media used categories and comparisons from everyday life when putting space science and nuclear physics on show, thus allowing their audiences to make sense of new scientific endeavors through familiar categories. In so doing, the two media tended to present innovation in science and technology as ordinary rather than exceptional. At the same time, such use of everyday categories in displays of knowledge was also a convenient means

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to obscure military uses of scientific knowledge as not relevant to the post-Hiroshima public culture of science.[2]

Although the public presentation of scientific and technological knowledge is receiving increased attention, scholarship remains limited and has concentrated most on printed media, books and newspapers.[3] This paper will complement and extend the existing literature by highlighting the role of material and visual communications in the early postwar period through two parallel case studies. The first discusses displays of nuclear physics in the 1950s and early 1960s. The second one considers the case of museum exhibitions and TV programs related to the science and technology of space exploration.

Current works discussing visual displays of science and technology on film, television and in museums demonstrate the pertinence of material culture studies for understanding these displays.[4] This literature draws attention to the value of looking at the processes of production of these displays, including the discussions and negotiations among historical actors through which they were constructed. In paying attention to the agency of filmmakers, television producers or museum curators, this scholarship also takes as focus the media's positioning in relation to science. In related fashion, it emphasizes the value of analyzing these media according to their own conventions, rather than in reference to other criteria (such as those of the scientific enterprise), if one is to get a proper understanding of these displays. For, as Gregory and Miller pointed out, studying science in the media is mostly about understanding the media.[5]

Examining displays of science and technology using insights provided by the study of material culture also makes relevant the problem of how audiences engaged with and understood exhibitions or television programs. In particular, it foregrounds the issue of viewers' bodily encounters with displays, of their somatic and sensory reactions, particularly to address the question, 'What did they see?.'[6] This approach, which addresses visual displays as 'active sites of cultural production',[7] seeks to understand the cultural meanings of science and technology intended by and produced in the museum exhibitions and television programs of the 1950s and 1960s.

As Jane Gregory and Martin Bauer have shown, nuclear energy and space exploration were the main topics for the public communication of science in Britain, in the 1950s and 1960s, respectively.[8] The Manhattan project and its outcome transformed the topic of atomic physics. The bombing of Hiroshima and Nagasaki changed the public status of nuclear research from relative obscurity to front-page headlines. At the same time, postwar governmental policy created a dichotomy between peaceful and military uses of the atom throughout the 1950s and beyond.[9] In the words of Ian Welsh, these events were part of 'a founding moment of high modernity.'[10] As were the first steps of space flight, an activity which, since the late 1950s, captured the imagination of political leaders, the media and their audiences as the epitome of the promises of scientifically and technologically mediated progress.[11]

In the postwar years, both the Science Museum and the BBC were key national institutions, mediating among political and economical elites – the Establishment – publics, and scientific and technical communities. The museum was a broadly popular site of visitation and arbiter of science and technology to British publics which, during the early 1960s, attracted roughly 1 million visitors a year. The three-day 1962 exhibition of the Mercury capsule Friendship 7, for its part, received 25,000 visits, which then had broad impact in the British press. In similar fashion, the BBC, which had come out of the war with a strong reputation of truth telling, saw an increase in the number of households equipped with a TV set from a little over 1 million in 1952 to around 12 millions in 1962.[12]

The period that will occupy us here, the 1950s and 1960s, is significant both in terms of the public culture of science and the development of the media that contributed to, and reflected this culture. The years following the so-called 1957 'Sputnik-shock,' witnessed a surge in concerns about scientific education in western countries, which continued well into the 1960s. What was then perceived as Soviet scientific and technological supremacy was seen as the outcome of a program of mass education producing battalions of skilled scientists and engineers, more efficient by far than what was going on anywhere in the West.[13] In Britain, major public interest for issues related to science and technology conjugated with the Establishment's perception that scientific knowledge was crucial for the national interest and to generate 'a particular linkage between science and national identity.'[14] As the newly established *New Scientist's* admonished in 1956: 'If Britain is to remain a first-class economic Power our Government, our Parliament and our people must become far more keenly aware of the ascendancy of science.'[15] Such ambitions called for practical means to represent technology and the sciences to the people and manufacture common understanding about the value and the significance of scientific and technological knowledge in postwar Britain.

This paper is about two such means. Both the Science Museum in London and the BBC were perceived by their personnel, the members of the scientific community and the Establishment as pivotal for implementing such national policy on the public value of science and technology. Moreover, and importantly, linkages between the two institutions helped reinforce this shaping of the public culture of science and technology in postwar Britain. This paper argues that these values intentionally mirrored those of everyday life. One purpose was to lessen public perceptions of risks. Another was to gain broad support for state-sponsored, large-scale techno-scientific projects and make them part of the public sphere by relating them to the lived experience of individuals. In that sense, the media under examination here may be said to have participated in the genesis of postwar ideas of democratic accountability for the politics of science and technology.[16]

These efforts to integrate science and technology in spectators' daily life through the use of domestic metaphors should not necessarily be seen as contradictory to the simultaneous call for national prestige exemplified above in the *New Scientist's* editorial. Indeed, as the examples used in this paper will show, the two notions of everyday life and national prestige often cohabited in the same display. For example, a television program about nuclear reactors on the BBC (*Fuel for the Future*, 1965) would compare British designs with American ones and have an American participant suggest that the British design was more efficient than its American counterpart. Or when the Mercury capsule Friendship 7 was shown at the Science Museum, part of the publicity for the show was to emphasize that London was the spacecraft's first stop on its world tour. The simultaneous call for national prestige and emphasis of the ordinary, instead of a sign of internal contradiction, can be seen as revelatory of a process of democratization of knowledge about science and technology in the postwar period.

In what follows, I will first briefly describe the way staff at the museum and at the BBC both positioned their display-making work in relation to science. I will then consider displays related to nuclear physics, starting with the Science Museum's1946 exhibition 'Atomic Energy and Uranium.' This topic, already present in the literature[17], especially as relating to international exhibitions, introduces the central thesis of the paper about the use of everyday life metaphors in displays of science and technology. I will then turn to the more substantial case study related to displays of space science and technology. This second part will focus on two cases, the 1962 exhibition of the Mercury capsule Friendship 7 and the BBC Horizon program *Man in Space* (1966).

Deploying good showmanship to attract spectators

At the Science Museum, under the directorship of Frank Sherwood Taylor[18], the early 1950s were marked by an intense reflection on the educational mission of the institution and how it related to schools. This reflection took place at a time when the political and economical elites expressed worries about a potential lack of skilled workforce to sustain the competitiveness of British economy. Sherwood Taylor's conception was that the Museum had to become 'one of the factors influencing young people towards the selection of Science and Technology as a career'.[19] And this mission could be fulfilled by providing 'instruction through pleasure'.[20] Accordingly, he invited curators to get inspiration from 'shop counter display, the strip cartoon, the variegated techniques of advertising, radio, television, the cinema and the stage'.[21]

Encouraged by the Advisory Council of the Science Museum[22], Sherwood Taylor established in 1951 the 'Committee on the provision for the needs of Children in the Science Museum,' intended to reflect on how best the institution could make children interested in science.[23] In 1955–1956, this Committee commissioned educational psychologists to study the behavior of young visitors and make recommendations on how displays should be organized to best suit this audience.[24] In the mid-1950s, still under the impulsion of Sherwood Taylor, the Museum established the Education Service, specifically devoted to liaising between schools and the Museum so as to improve the latter's educational role.[25] One of its first accomplishments was to set up, starting in July 1955, special lectures for visiting school parties, featuring demonstrations designed to illustrate 'fundamental principles in physics and in engineering.'[26] The idea for these lectures originated in a conversation Sherwood Taylor had in September 1954 with Sir Lawrence Bragg, a Nobel laureate in physics, on the latter's own series of lectures for schools at the Royal Institution.[27] Likewise, the Museum's lectures were aimed at sixth-form school children, laid emphasis 'on the historical development of science and engineering,' and were constructed around performances of historical scientific experiments.[28]

Though placing emphasis on the Museum's educational role, all this reflection did not aim to have the Museum imitate the pedagogy in schools; rather it assumed that the Museum had its own mode of address. In the words of William O'Dea, then the Keeper of Aeronautics and Sailing,

> Museums are (…) educational institutions in which teachers, as distinct from curators, may have specialized functions. Teachers may lead study groups of definable age categories or competence and may organize educational activities. The curator on the other hand must try to make his exhibits intelligible to all groups and repellent to none. The art of the curator is to *beguile*, and by so doing to educate.[29]

O'Dea then concluded: 'Why, at least out of school, and probably even there as well, should education not be fun?'[30] The Science Museum was thus meant to inspire young visitors to engage in a career in Science and Technology, but was also to be a means of education of the whole population. And entertainment was the method for simultaneously addressing these different audiences.

In comparison, period television was fashioned, in terms of the practices involved in constructing the output, as well as the values and beliefs associated with it, as a medium that could be at the same time informative, entertaining and educative. As James Farry and David Kirby recently reminded us in this journal,[31] when the BBC television service resumed after World War II, it was within a corporation still dominated by the 'spoken word.' Two professional cultures began struggling to shape it: one originated in the world

of radio broadcasting, the other came from film-making. The former was undertaken by personnel from BBC Radio who had moved over to staff the new television department. They brought with them formats of programs and ways of making them, centered on the studio and the notion of live performance. Their institutional home was the Talks department. Film-makers, on their part, housed first in the Documentary department, and later, in the Outside Broadcast Department, privileged visual form and storytelling.[32] This was where the science program *Horizon* (still a BBC fixture) was created. A third and later force shaping the medium was introduced with the 1954 Independent Television Act, which pushed the BBC to compete with other broadcasters to attract audiences' attention. In this postwar period marked with strong beliefs in the value of science and technology as vectors of progress and social improvement, television producers perceived science as a source of potentially visually spectacular programs critical in competing for the attention of viewers.[33]

Throughout the late 1950s and early 1960s the BBC and the Science Museum developed a dense two-way relationship, to the extent that in the 1964 report of the Science Museum it was stated: 'The Science Museum actively and willingly assists science television'.[34] The Museum lent objects for programs, and it also saw the BBC as a means to reach audiences outside London. For example, the BBC Children's Hour program *Science on Show* on 9 January 1959, was broadcast live from the Science Museum Children's Gallery, with several exhibits demonstrated by former guide-lecturer Sydney Herbert Grooms, who had retired in 1958 but was brought back for the program.[35] Lectures at the museum (performed by guide-lecturers from the Education Service) that had been particularly popular also provided content for television:

> In the case of 'Experiments in Radio-activity' by R.A. Faires, for example, the officer in charge of the [Education] Service had to ask the B.B.C. to put this on schools television in order to relieve the lecturer of the burden of tedious and laborious repetition to groups of 180 at a time. If and when this lecture is adopted by the B.B.C. our attendances (*sic*.) are bound to drop, but a vast school population, numbered in hundreds of thousands all over the country, will gain.[36]

Although in the mid-1960s drops in attendance to the Museum's lecture demonstrations were attributed to the rise in prominence of television, this relationship between the Science Museum and science television was perceived as 'a good thing, if one views science education from a national and not a parochial stand-point.'[37]

As will appear in what follows, a similar approach to the public presentation of science and technology was being developed in the two media at roughly the same time, based on similar understandings of audiences expectations. Such similarities should not come as a surprise, for both the museum and television participated in the same 'cultural apparatus', which was dominated by visual forms of entertainment and made the subject a spectator rather than a participant, and whose roots go back to the second half of the nineteenth century.[38]

In 1950, Henry Calvert, curator of the Department of Astronomy of the Science Museum, authored a note arguing that displays should be simple and amusing. Visitors, he said, will stop at an object if it is 'attractively displayed.' In his view, erudite labels and instruction came only second after 'good showmanship,' which was the means to attract and retain the attention of the spectator.

> This then should be our method: to attract people to an object by good showmanship, and when their interest is aroused to make sure that the instructive explanation is easily at hand to satisfy their curiosity.[39]

In this note, Calvert argued for and sought to apply to the entire Museum the strategy of displaying eye-catching and amusing exhibits used since 1931 in the Museum's Children's Gallery. Although, he stated, the Science Museum caters for 'a varied public of many degrees of education,' most visitors are not drawn to the Museum by a deep interest in Science, but because they are looking for entertainment. And the Children's Gallery 'is what makes an impression on them.' This gallery played a central role in the Museum, as captured in the words of its founder, Frederick St A. Hartley,

> although there are a number of exhibits illustrating elementary principles, the Gallery's chief purpose is to show what things *mean*, that is, their significance in our daily lives, rather than how they *work*.[40]

Good showmanship was to be deployed in the whole museum to attract visitors and enable them to relate what they saw, the artifacts, processes, principles put on show, to their everyday material experience. Pleasure could then be derived from seeing abstruse things through a familiar lens.

On television, entertainment and visual pleasure were, likewise, given priority over pedagogy. Shortly after television broadcast had resumed in Britain after World War II, some prominent British scientists, believing that the young medium could be harnessed as an efficient means of increasing scientific literacy and the appreciation of science in the general population, sought to exert control over the BBC's science broadcasting.[41] Television personnel involved in defining television science agreed on the necessity to scientifically educate the population (not least because several were science graduates). But they were at the same time keen on remaining in control of the medium.[42] As was the case with exhibitions at the Science Museum, displays of science on television were conceived of by their makers as having to be primarily entertaining and pleasurable in order to draw and retain spectators' attention. Once pleasure had been elicited, some of the ideas of science could be communicated.

For instance in 1957, television producer James McCloy justified a projected television program about space travel because it could be at the same time 'entertaining, interesting, and responsible.'[43] But, the notion finds a still clearer expression in a 1963 memo from television science producer Philip Daly, written when planning was still ongoing at the newly established BBC Outside Broadcast (part of the network's Feature and Science Department) about the form the projected science program *Horizon* should adopt,

> 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. We must avoid the didactic approach at all costs. The intent always must be ideas and the problems associated with those ideas; never the straightforward teaching and demonstrating approach as an end in itself.[44]

As this quote shows, science museum curators and television science producers in the 1950s and 1960s both emphasized the necessity to privilege visual pleasure, and insisted that displays should be focused on conveying the meanings of science and technology rather than on pedagogy and education. In each instance, these efforts relied on the use of visual metaphors related to everyday life.

'Unlimited power for mankind from the hydrogen in sea-water!'[45]

The examination of public displays of nuclear physics as they took place during the 1950s and 1960s, both at the museum and on television, shows that both media relied on extensive use of everyday life categories to present nuclear science and technology to their audiences. This helped lessen negative feelings toward the vast destructive power of this new capability and to downplay the fearfulness associated with its military uses. This fell in line with the philosophy of the 'Atom for Peace' program, initiated by President Eisenhower's presentation to the UN General Assembly on 8 December 1953. It was also coherent with recommendations from the British Government, which, in 1955, encouraged the media to avoid causing 'distress [in the public] by needless exposition of the detailed results of thermo-nuclear explosions or to induce a state of hopeless inertia'.[46] In looking to life categories as a rhetorical resource, the trope of domestication gained prominence; nuclear physics and its applications were fashioned as a process of taming an elementary force of nature, controlling it, making it meaningful for an everyday use.[47] Thus, research directed towards peaceful uses of the atom stood in marked contrast with weapons development, from which normal science practice was actively distanced.

Atoms in the kitchen

In 1946, one of the first exhibitions at the Science Museum on reopening after World War II, was called 'Atomic Energy and Uranium.'[48] The introductory part of the display consisted of laboratory objects and instruments such 'as Bohr atom-models, a careful selection of Wilson track photographs, Aston's mass spectrograph, Cockcroft and Walton's [accelerator], and an early cyclotron of E.O. Lawrence.'[49] But besides this presentation of historical artifacts from the early days of research on atoms, the point of the exhibition was also to 'give visitors some idea of the nature of Uranium, what it is, how it is extracted and for *what it is commonly employed.*'[50] Alexander Barclay, the keeper in charge with elaborating a scheme for the exhibition, suggested that the display should comprise a map showing the main sources of uranium, specimens of uranium ores and of metallic uranium, photographs illustrating mining and ore dressing, as well as specimens of uranium compounds. Finally, there should be 'examples illustrating *everyday uses* of uranium compounds (e.g. fluorescent glass, pottery glazes, special steel, etc.)'.[51]

The description of the exhibition and of its intended objectives points towards the use of categories related to everyday life, the mundane and the banal, and away from the associations with the military or the extraordinary. Although one could argue, as Sophie Forgan does, that these pots and plates 'had nothing to do with atomic energy'[52], they were an integral part of the exhibition and enjoyed great popularity among visitors.[53] Such objects (whose glowing property was revealed by special lighting) had been specifically selected for the exhibition to convey meanings about the everyday use of uranium. As much as the historical science objects put on display, easily associated with 'pure scientific research',[54] this kitchenware provided a material means through which audiences could become familiar with uranium and the whole topic of atomic energy, and gather knowledge about it. Such estheticizing of the primary material for the atomic bomb, and associating it with basic kitchenware, served as one of the exhibition's multiple points of entry to understand nuclear physics, allowing visitors to integrate the subject with their daily life experience.

This choice of approach may have been partly motivated by uranium's topicality. The exhibition, organized just months after the two atomic bombs had been dropped on

Hiroshima and Nagasaki, killing 210.000 people, dealt with a sensitive topic. As Hermann Shaw, the director of the museum put it, 'I realise that the present policy may not allow the full story of uranium to be told.'[55] To foreground more mundane uses of uranium was, thus, a way of saying something about it nonetheless.

Still military applications of atomic physics in the form of weapons of mass destruction were evoked in the exhibition. This was done in a rather playful way with a 'Mechanical model of an atomic bomb',[56] an object which, in its design, might have been at home in the Children's Gallery. Built by Keeper Francis A.B. Ward, it was made of a number of units, each consisting of a mousetrap and three ping-pong balls to represent the nucleus of an atom of ^{235}U or of plutonium.

> The reaction is initiated by dropping a single table-tennis ball upon the unit in the first row. (…) The ball then falls upon the target of the unit in the first row; this unit explodes, projecting its three 'neutrons' upwards and to the right (…); some of these 'neutrons' impinge upon the targets of other units, which also blow up, and the 'chain reaction' is established. If a relatively large number of hits happen to be scored in the first few rows, the action becomes almost 'explosive' in type, and lasts only about three seconds, but, if the early number of hits is smaller, the release of energy proceeds more steadily, lasting 5 to 10 s.[57]

This 'model of an atomic bomb' was 'demonstrated daily until 1948, and aroused much interest'.[58] Made of very mundane items – mouse traps and ping-pong balls – it presented the physical principle playfully and made it easily graspable, while putting its fearful consequences at a distance.

Cheaper electricity for everyone

A similar trajectory can be recognized in presenting nuclear energy on television. An example is the 1965 *Horizon* program *Fuel for the Future*. It was billed as an attempt to inform viewers about the type of nuclear reactor chosen to equip the next generation of power stations in Britain. It took the form of a studio sequence during which the head of the Reactor Physics Group of the UKAEA (United Kingdom Atomic Energy Agency) and the chairman of the Central Electricity Generating Board (CEGB) were questioned by a reporter and the BBC science correspondent. This was complemented by a display of models of reactors and nuclear research sites, and a filmed tour of the Atomic Energy Research Establishment at Winfrith Heath.

Although the program dealt with basic aspects of the functioning of a nuclear reactor, the main idea conveyed to viewers was that a nuclear reactor produces 'cheaper electricity.' As the billing for the program in *Radio Times* read:

> The design was called AGR, standing for Advanced Gas-cooled Reactor, and it was chosen in preference to, among others, a promising American design. It was for the designers a promise of prestige, and for the consumers – you and I – a promise of cheaper electricity.[59]

In the course of the studio sequence, a question from David Wilson, the BBC science correspondent, specifically addressed the functioning of a nuclear reactor and the differences between the two designs. This eventually led to the representative of the UKEAE suggesting that the choice of design had been made on the ground of a cost–benefit analysis. Gas-cooled reactors can work with non-enriched uranium, which the competing design did not allow. And 'the plant for manufacturing slightly enriched uranium we regard as being an expensive plant in this country.'[60] The representative of the CEGB

concurred. The gas-cooled reactor was chosen 'because it was the best buy. (…) the A.G.R. (…) produces power rather more than 10 per cent cheaper than coal and about 7 per cent cheaper than its closest nuclear competitor.'[61] The television program, thus, framed nuclear energy for their audiences in terms of the costs of producing electricity and the positive consequences it would have for the household economy. Besides, as the quote from the *Radio Times* shows, in this rhetoric the quest for national prestige could be merged with domestic political interest in lower energy costs.

As these examples of exhibitions at the Science Museum or television programs suggest, displays of nuclear physics in the 1950s and 1960s aimed to provide audiences with just enough basic science to understand the changes in their everyday life brought about by the scientific enterprise and to welcome these changes as beneficial.[62] Pivotal to this effort was the construction, inside the displays, of categories related to everyday life in the household, such as displaying kitchenware, or emphasizing the benefits nuclear physics brought to the domestic economy.

This strategy was evident in other period television programming and exhibitions, such as the 1957 episode of the BBC series *Frontiers of Science* titled 'Nuclear Energy in the service of Man,' and the 1962 Science Museum exhibition 'Atoms at work,' designed by the UKAEA. The latter first introduced 'in simple language the basic principles of atomic structure and nuclear fission.' It then dealt with the working of

> a nuclear reactor; the British Nuclear Power Programme, the manufacture of uranium fuel for reactors; the development of new types of reactor for electricity generation; the use of radioisotopes in industry, medicine, agriculture and research; fundamental research, e.g. into the nature of atomic nuclei and the behaviour of materials which are or might be used in nuclear reactors.[63]

Placing such an emphasis on such categories as receiving medical treatment, producing food and work in the factory gave credence to the idea that domesticating nuclear energy was unproblematic and ordinary. It also put forward a definition of scientific research as an enterprise devoted to controlling nature for the benefits of humankind.[64] The mode of exposition used in displays of nuclear physics constantly summoned the rhetoric and material culture of the private sphere and placed them in the public context of a museum exhibition or a television program. In turn, it also brought the public realm of the state-sponsored work of scientific knowledge and technology into the privacy of everyday life. The distinction between private and public has been classically analyzed in relation to the notion of risk, the private space of home associated with safety in contradistinction with the public space and its associated risks.[65] Considered in the postwar context of new and potentially threatening knowledge, these modes of display mobilized the private to defuse any feeling of risk in relation to nuclear physics and its applications.

In this period, in the West, no object other than the car (a 'public-private hybrid'[66]) better epitomizes the interpenetration of the private and the public identified in these displays of scientific and technological knowledge. It should not come as a surprise then that the car metaphor became central to strategies of presentation in another field of scientific and technological innovation: space exploration.

Space travel, the future of the automobile

The 12th of April 1961, the day when Soviet cosmonaut Yuri Gagarin successfully orbited the earth aboard the spacecraft Vostok 1, marked the beginning of a human presence

in space. It took the US nearly a year to equal this feat, placing astronaut John Glenn, riding in Mercury capsule Friendship 7, in orbit on 20th of February 1962.

Less than three months after Glenn had orbited three times around the earth, the US State Department, via its embassy in London, offered the Science Museum the spacecraft to exhibit.[67] The offer was greeted with enthusiasm, with the exhibition occurring from 14–17 May 1962. The display was part of a world tour organized by the US Information Agency (USIA), in collaboration with NASA, in an effort to publicize the US space program and, at the same time, valorize it for the American people. It is notable that Kenneth Kleinknecht, manager of the Mercury project, was eager to obtain copies of photographs of 'lines of people'[68] queuing to see the spacecraft. The Science Museum was the first stop on the world tour outside the American continent, and Kleinknecht must have been satisfied. About 25,000 people attended the show, queuing all the way down Exhibition Road, hoping to have a look at the capsule and its illuminated interior (Figure 1).

In 1962, a space capsule was still a novelty. By the time of the London display, between the USA and USSR only five manned spacecrafts had been successfully launched.[69] For visitors, the May exhibition was the first opportunity they had to see and understand an actual spacecraft.[70] The Friendship 7 exhibition was as much about teaching people how to interact with such an object as it was about communicating knowledge of the budding field of space exploration. Organizers of the exhibition sought to shape public perception of space-related artifacts, fostering specific public representations of space science. As is the case with any other instance of mediation, this was to be achieved by appealing to visitors' own sense of agency.[71]

The Friendship 7 exhibition was modest in scale. The capsule was the sole object. Lying on a trolley, it stood in front of a curved panel displaying photographs illustrating

Figure 1. 25,000 people queued to have a chance of seeing the Mercury capsule Friendship 7 at the Science Museum in London. Here the queue on Exhibition Road goes all the way down to Cromwell Road

different stages of the mission (Figure 2). Designed as an immersive and a multisensory experience, the exhibition involved hearing, sight and touch. It was meant to provide visitors with a lived experience of space flight, turning them into participants in the endeavor rather than mere spectators. As with the discussion of displays of nuclear physics, this exhibition also used the fabric of daily life as a communication strategy rather than one that featured the actual science of space flight.

As they queued, visitors first heard a sound-recording played in a loop of a three-minute extract of the communication between the capsule and the control rooms on the ground. Passing through a narrow doorway, they would then step into a panorama, figuratively positioning them in space alongside the capsule in orbit. The spacecraft, installed on its podium, stood before a large curved panel displaying photographs depicting different stages of the mission (Figure 2). The backdrop to the capsule itself was a photograph of the west coast of the African continent, taken from the capsule while in orbit. This latter picture was specifically intended to be 'seen by approaching visitors as a background for the capsule'.[72] The whole display, thus, visually located the capsule in its most dramatic context, making visitors part of the unfolding epic of the space age.

The whole exhibition was premised on the notion that knowledge can be acquired and communicated by visual means. Designers insisted that the photo-panels have 'no text,' and therefore required 'no translation.'[73] Alongside the spacecraft was a platform. Climbing up a few steps, visitors could lean on the capsule and have a look inside it. This opportunity to glance into Friendship 7 was the main attraction advertised in advance. The press notice announcing the London exhibition, stated that

Figure 2. The exhibition was simple. The capsule, lying on a trolley, stood in front of a curved panel with photographs. Visitors could climb on a platform to examine the spacecraft

> Complete in every particular as when it was recovered from the Pacific […] the space capsule, both inside and out, can be viewed by visitors to the exhibit. Although closed, a view of the inside of the capsule will be had from the small window through which Col. Glenn saw four sunsets. For its London Showing, a figure in a space suit representing the Astronaut will be seated at the controls in the spacecraft.[74]

What was invited here could be termed a 'reversed gaze,' explicitly installing visitors in a reversed position as compared with Glenn's, making them wholly external to the spacecraft. Through this advertised reversed gaze the capsule was constructed for the audience as 'a technology to be seen,' whereas to Glenn it was a 'seeing technology' (Figure 3).[75] This reversed gaze through the window had a voyeuristic undertone. Visitors were provided with a sense of the intimacy of the capsule as a confined living space and to imagine themselves in the position of the astronaut. With this invitation, the capsule is posited as an object of inquiry, an object about which visitors could gather knowledge on their own terms.

The same could be said of the NASA film depicting the mission, *Friendship 7*, shown in the Science Museum's Lecture Theatre seven times a day during the three days that the exhibition lasted. The film consisted mostly of edited footage of what was happening in the confined space inside the capsule, obtained with a 16 mm camera inserted in the spacecraft's control panel. Taking views of 'the astronaut's face and upper torso area in color at 360 frames/min or 5 frames/min, depending on the mission phase',[76] the camera was meant to provide physiologists and other scientists with data about the astronaut's physiological response to flight. This 'pilot-observer camera,' as it is called in the flight report, was thus an instrument of surveillance, meant to capture Glenn's reactions and behavior. For visitors, the film offered the possibility to voyeuristically witness what happened to Glenn within the capsule, the close-ups of his face providing material for them to imagine what it was like to be in the capsule. Visual artifacts which had been of use to scientific practitioners to generate physiological knowledge about space conditions served as sources of another kind of knowledge for a public audience.

Historical studies indicate that 'display as a specialized aspect of advertising' has informed the physical organization of museum exhibits since at least the 1930s.[77] The mode of display of Friendship 7 can be seen through this lens, in particular in its similarity to advertising strategies used in motor shows.[78] The layout of the exhibition suggests that the capsule, as a vehicle, was meant to be encountered in the same way as a new model of car in a motor show. The museum display, it might be argued, sought to provide the audience with means of relating their encounter with the capsule, an extraordinary artifact, to more familiar, mundane, experiences, such as looking at the latest model of Volkswagen. Moreover, the designers displayed the capsule so that a visitor looked down on it, making it seem small and unthreatening. In other words, the museum display presented space exploration, as embodied in the displayed spacecraft, in a manner consistent with everyday experience. It gave preference to a narrative that rendered the capsule and the broader project of space flight exciting, but yet ordinary, rather than emphasizing the complexities of advanced science and technology and the work and research poured into developing it.

Audiences' reactions to the exhibition seem to support this hypothesis that the capsule was viewed from a matter-of-fact perspective. Questions from visitors (contained in the report from the NASA technician on duty for the London exhibition) included: 'What was the capsule temperature [when it re-entered the atmosphere]? Why is [the] capsule black? Are we ahead of the Russians? What problems did Glenn have? etc.'[79] A

Figure 3. Reversed gaze. 'A view of the inside of the capsule will be had from the small window through which Col. Glenn saw four sunsets.' Visitors gazing at the spacecraft's illuminated interior

correspondent from *The Times* reported that 'the general comment appeared to be: "Isn't it small?".'[80] In their encounter with the capsule, people focused primarily on details that reflected their own imagining of the experience of the astronaut. They did not seem overwhelmed by the artifact itself, nor did they ask questions about the larger context of

science and technology of which space flight was a part. The exhibition sought to and apparently did render space flight graspable to a typical, non-specialist visitor.

On the evening of the first night of the London display of Friendship 7, the BBC program *Panorama* was broadcast live from the Science Museum. The first part of the program featured trusted host Richard Dimbleby describing the capsule and the mission (Figure 4). A 10-min extract from the NASA film *Friendship 7* followed, and then a researcher from MIT was interviewed on the prospects of space exploration. In his presentation of the spacecraft, Dimbleby insisted on its smallness, its approachability. He touched it repeatedly and in a gentle way as if to demonstrate its innocuousness. Next he disappeared from the frame, offering viewers a seemingly unmediated encounter with the capsule, save from his hand waving from time to time at the margin of the frame, a reassuring reminder that nothing was to be feared from the machine. His commentary included minimal technical knowledge, presumably regarding it as esoteric and irrelevant to the everyday person:

> The whole cockpit is a solid mess of dials and gauges. Impossible for me to explain what all these things here mean, but Glenn had to know the meaning of them all. They told him what was happening.[81]

Instead, Dimbleby focused on what the astronaut endured while in the capsule, thus falling in line with the general anthropocentric coverage of space by the BBC. The tone is decidedly playful, as when Dimbleby addresses the camera, as if addressing members of the audience, inviting them to come closer and have a look inside the capsule, thus again placing emphasis on a non-technical, everyday appreciation of the object. His closing commentary to the program epitomized this approach:

Figure 4. In the evening of the 14 May 1962, BBC's current affair program *Panorama* was broadcast live from the Science Museum. Richard Dimbleby opens the program standing against the spacecraft
© The Science Museum, London/Science and Society Picture Library.

> And so we end Panorama tonight, as we began, in the Science Museum, leaning up against what has now became our old friend, Friendship 7.

The possibility of physically encountering the capsule and looking inside it was the defining feature of the exhibition. This was the attraction advertised in advance; it was also how the capsule was shown on television. Taking into account this materiality of the display suggests that the capsule, lying on a podium with visitors coming close and bending over to look through its window, mirrored the display of new models of cars at motor shows. The automobile, the epitome of twentieth-century industrial capitalism, provided a key metaphorical resource for the display of another vehicle, a space capsule.

Such analogy was expressed explicitly in the May 1966, BBC broadcast of a *Horizon* program titled *Man in Space*, intended to present the subjective aspects of space travel. As Adrian Malone, the program producer, explained – lyrically – in a letter to NASA's John McLeish:

> The subject of our programme, briefly, is man in space. (…) It is easy for the layman to think of the astronaut as a superman – almost a machine, who is the product of a large complex and expensive technological, political and scientific process. One tends to forget that the astronaut is human and therefore the greatest care must be taken to maintain this most delicate of instruments, the human being. It is this scientific attention to what seem to be minor everyday details which is the element which we would like to underline.[82]

In 1966, as in 1962, the display of space exploration was approached, as this citation indicates, from an everyday life perspective, that is from a perspective that emphasizes such corporeal and taken-for-granted aspects of existence as eating, sleeping, etc. This program from the *Horizon* series, 'the main prestige program in the BBC science output.'[83] was conceived so as to allow 'the layman' to relate to this highly sophisticated scientific endeavor through familiar and homely categories, thus making space accomplishments approachable, easier to integrate into people's daily life experience.

To begin with, the opening shot of *Man in Space* quite straightforwardly establishes the car as the central metaphorical resource of the program. The sequence is very cinematic, its esthetic reminiscent of 1950s film noir. The first frame is taken from inside a car, looking towards the street through the opened driver's door, the wheel in the foreground. A man enters the car and sits behind the wheel, closes the door and turns the ignition on. The car starts advancing while a voice (later identified as that of astronaut Frank Borman) is heard saying: 'we all live in the community in suburban America out here, not in barracks but individual little private homes. I feel just like a father that lives in suburbia trying to raise two boys and away from home more than I would like to be.' Then follows a cut to an extract of the 1962 film *Friendship 7,* with John Glenn strapped on his seat, seen at the moment of take-off, while the opening titles appear on the screen (Figure 5).

The piece de resistance in the program is an interview with astronaut Frank Borman, who had flown on the Gemini 7 flight, spending two weeks in orbit. Significantly, early on in this interview the astronaut himself elicits the metaphoric relationship between the space capsule and the car, when offering the comparison that will help viewers imagine what it was like to spend 14 days cramped in the capsule: 'Well, people can project the problem if they imagine living two weeks in the front seat of a Volkswagen'.[84] In the rest of the interview, Borman actively downplays the extraordinary quality of space flight, consistently relying on down-to-earth categories to make sense of it.[85] For example, he revealed that during the flight, he and his crewmate were authorized to take their space

Figure 5. Opening title of the *Horizon* program, 'Man in Space', broadcast on 8 May 1966. The image is taken from the NASA film *Friendship 7*, and shows astronaut John Glenn strapped in the Mercury spacecraft during take-off

suit off, and so 'completed the flight in [their] underwear.'[86] Or regarding food, the astronauts' eating pattern was that of 'a regular day (…) breakfast, lunch and dinner.'[87] The Gemini capsule, thus, comes out from this interview as 'a domestic, cocooned, moving capsule, an iron bubble'[88] in which domestic daily life is enacted, in the most alien of environments, space. Such framing of the spacecraft as a moving intimate space is a hyperbolic version of the way in which the car was, and still is, experienced.

Both the 1962 Science Museum display and the two television programs discussed here, relied on everyday categories to explain space flight, either implying or directly referencing automobile imagery. Audiences were, thus, provided with means of relating their encounter with extraordinary artifacts and an exceptional endeavor to more familiar experiences, bringing the experience of space down to earth.

The different ways that each medium achieved this are revealing of the structures and conventions in which each operated as a mode of display in the early 1960s. Television often mediated the relationship between viewer and subject through the person of a trusted presenter, making the artifact fit within the domestic context of television broadcast reception.[89] The museum authorized co-presence, encouraging a physical interaction with the artifact. However, when Richard Dimbleby first introduced the Friendship 7 capsule to the British television audience in 1962, he did so by stating that it was the spacecraft 'in which colonel John Glenn made his wonderful three orbits round the earth (…) the actual machine that has done the virtually impossible,' before emphasizing the capsule's smallness and insignificance. The use of everyday life categories can be seen as a form of understatement in which the weaving of spectators' daily experience with representations of the extraordinary endeavor of space flight erased the distance between

private individuals and a massive state-sponsored techno-scientific undertaking. It also, importantly, provided a means to create broad public awareness and support for state activities, in what could be interpreted as a process of democratization of knowledge of science and technology.

Conclusion

In this paper, I have tried, through the examination of displays of nuclear physics and space science and technology in museum exhibitions and television programs, to get a sense of the public culture of science that the two media both reflected and shaped. The museum display enabled visitors to physically measure their bodies against the artifacts while television programming provided trusted voices to narrate meaning. Despite such formal differences in the two modalities, this paper argues that both deployed similar metaphors when presenting space exploration or nuclear energy to their audiences.

Both the Science Museum and BBC television appear to have drawn, primarily, on the symbols and values of everyday life in a postwar western society, such as the car, domestic comfort or the belief that the household is the basic unit of society. In this way, the two media can be said to have enabled their audiences to appropriate the sciences on display and in a sense to domesticate them, making them ordinary rather than exceptional. Further, weaving values and symbols of private life within representations of such public undertaking as research programs in nuclear physics or space exploration programs was a means of defusing fears of risk, as well as democratizing these endeavors.

But, using displays to associate these values and symbols with science and technology was also a way of reinforcing and naturalizing all of these elements of the social order. Television science and technology programs as much as exhibitions at the Science Museum can, thus, be seen as mediators in the co-constitution of knowledge and society. Not least, in the western context, relating fields of scientific inquiry and their applications to everyday life categories meshes with an ideology of progress.

Ghislaine Lawrence compared the coverage of medicine in the two media and found differences: the Science Museum was more reverential in its displays relating to medicine than television.[90] The present paper shows that the two media were more similar in their approach in the postwar years to nuclear physics and space science than Lawrence's paper would have led to expect. One way of accounting for the similarities identified here would be to remark that in the period covered by the research, television producers were still in the process of understanding their medium. As historians of television insist, the period from the early 1950s to the early 1960s was one of self-definition, in which conventions of display were progressively fashioned. The culture of television broadcasting that emerged in the late 1960s was a synthesis of the dialectical interaction between the cultures of radio broadcasting and of film-making.[91] Television science and technology program-makers were, thus, more likely to get inspiration from other public institutions involved in the business of making scientific knowledge public. Further, such similarity of approach could also come from the fact that for space exploration and nuclear physics, both the Science Museum and BBC television had to deal with the same interlocutors, NASA and the UKAEA, respectively. For instance, the models of nuclear installations shown in the 1965 Horizon *Fuel for the Future* are recognizable as similar to those the UKAEA provided to the Science Museum for the 1962 exhibition *Atoms at work*. Such institutional framing led to a certain unity in the discourse. The Science Museum and BBC television themselves, thus, can be thought of as audiences of the public institutions on which they relied to construct their displays.

The case studies presented here are suggestive of the role of media in the public culture of science. As stated in the introduction, the scholarship of the field is not at a stage which allows for broad generalization. Further research would need first to examine more topics than the two highlighted here, and engage with a wider range of media, not only television and the museum but, for example, also magazines and newspapers, literature, advertisements, theatre and fictional cinema. It is worth mentioning, for instance, that a 1969 advertisement for the automobile brand Volkswagen used a picture of a model of Apollo 11's Lunar Module with the slogan 'It's ugly but it gets you there,' thus suggesting that as much as the car metaphor was used to 'sell' space exploration to audiences in the early 1960s it also worked the other way round.[92] Second, a more detailed sociology of the actors under consideration (of those producing the media output and of those consuming it) would be needed, paying attention to the construction and contestation of different media. This would allow for a better understanding of the social dynamics at work around the cases discussed in this paper. These examples suggest that in the 1950s and 1960s the public culture of science and technology was constructed by making them part of audiences' daily life experience.

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Notes

1. See the recent focus section in *Isis*: "New Perspectives on Science and the Cold War," Vol. 101 (2) (June 2010). The quote is taken from the introductory essay by Hunter Heyck and David Kaiser, "Introduction," 363.
2. On this last point see Desmarais, "Jacob Bronowski."
3. See, for instance, the essays in Bauer and Bucchi, *Science*, or the focus section in *Isis* 100, no. 2 (2009) on the history of popular science.
4. Works dealing specifically with the public presentation of science in non-print media in the postwar include the last chapters in Boon, *Films,* and the papers by Forgan, "Atoms;" Farry and Kirby, "The Universe;" Macauley, "Crafting the Future;" Gouyon, "The BBC" and "From Kearton;" or Boon, "British Science Documentaries;" Silverstone, *Framing* and Silverstone, "Science, TV." For essays on the relationship between film and science, where film is addressed as a scientific instrument, see the special issue of *Science in Context* 24, no. 3 (2011)*, Cinematography, Seriality and the Sciences* edited by Janina Wellmann, although this collection of essays is very much science-centered, and does little to question the top-down model of the communication of science. On museums see the work by Sharon MacDonald, in particular *Science*, and *Behind*. See also de Chadarevian, "Models;" Nyhardt "Science;" Silverstone "Museums" and Silverstone, "The medium."
5. Gregory and Miller, *Science*, 106.
6. On the heuristic value of engaging with visual displays as items of material culture see Jordanova, *The Look*, and the introduction in Edwards et al., *Sensible.*
7. Ann Brower Stahl, cited in Edwards et al., S*ensible*, 3.

8. Bauer and Gregory, "From journalism," 44.
9. On "the atomic age", see the special issue of *History and Technology* edited by Morris Low and Robert H. Kargon, *Visions of the atomic age*.
10. Welsh, *Mobilising*, 35.
11. The literature here is vast. See, for instance, Mc Curdy, *Space*, Byrnes, *Politics*, or Geppert, *Imagining*. See Macauley, "Crafting" on pre-WW2 space imagination in Britain.
12. Briggs, *The BBC*, 167.
13. See A. Kojevnikov, "The Phenomenon," 132–133.
14. Agar, *Science*, 20. The case of nuclear energy in Britain is emblematic. In the early 1950s Britain was in a leading position. Following the 1956 opening of the Calder Hall reactor Britain was the first place in the world where nuclear-generated electricity was fed into the national grid, and the country was home of the first civil nuclear power program. Further, the country was actively developing an independent nuclear deterrent, geared towards testing, producing and stockpiling weapons, including H-bombs. This military program was seen 'as essential to Britain's prestige and standing in the world, and especially her power to influence America's policy' (Arnold, *Windscale 1957*, 26).
15. Quoted in Agar, *Science*, 22.
16. On these notions see, for example, Callon et al., *Acting*.
17. See notably Forgan "Atoms;" Mollela "Exhibiting;" Schmid, "Celebrating;" Shroeder-Gudehus and Cloutier, "Popularizing."
18. Sherwood Taylor was director of the Science Museum from 1950 until his death in 1955.
19. Science Museum – Report of the Advisory Council for the year 1955, 2 (SCM file Z150 – *Science Museum reports – Advisory Council reports*).
20. Sherwood Taylor, "Children," 203.
21. Science Museum – Report of the Advisory Council for the year 1955, 2 (SCM file Z150 – *Science Museum reports – Advisory Council reports*).
22. A body composed of representatives of scientific and technical institutions and industrial groups. Its mission was to assist in the management and development of the Museum. It was also intended to tighten the links with the British industry, notably through the organization of special exhibitions, funded by industrial bodies. One intent of these temporary exhibitions was to ensure that competent work force would be available to the industry. See the essays in Morris, *Science.*
23. Science Museum – Advisory Council – Committee on the provision for the needs of Children in the Science Museum. *Minutes of the first meeting held on October 1st 1951*. (SCM file Z253 – *Children's Gallery Inception and History*).
24. Nielsen, "What things mean."
25. Boon, "Parallax Error?", 115. On Sherwood Taylor and his conception of what the Science Museum's mission was and how it should be fulfilled, see Anthony, "Ambition and Anxiety," 91–95.
26. "Series of special lectures illustrated by demonstrations," paper presented at the meeting of the Advisory Council of the Science Museum, 6 October 1955, paper C (SCM file Z193-2, *Record copies of papers presented at Advisory council meetings to supplement official minutes*).
27. Memo, "Lecture demonstrations," 30 September 1954 (SCM file Z194 – *Children's interest subcommittee*).
28. Report of the Science Museum for 1955, 2.
29. O'Dea, "Science Museums," 243.
30. O'Dea, "Science Museums," 245. Emphasis added.
31. Farry and Kirby, "The Universe."
32. Boon, *Films*, and Boon, "British."
33. Farry and Kirby, "The Universe."
34. Report of the Science Museum for the year 1964, 4 (SCM file Z150 – *Science Museum reports – Advisory Council reports*).
35. See the photographs of the broadcast in SCM file Z111-18.
36. Report of the Science Museum for the year 1964, 4 (SCM file Z150 – *Science Museum reports – Advisory Council reports*).
37. Report of the Science Museum for the year 1964, 4 (SCM file Z150 – *Science Museum reports – Advisory Council reports*).
38. Lawrence, 'Museums;' Crary, *Technique*.

39. Henry Calvert, 'Some Notes on presentation of Technical information in the Science Museum,' 31 October 1950 (SCM nominal file 1765 part 2 *University College London*).
40. F. St A. Hartley, *The Children's Gallery. A Guide to the Exhibits in the Introductory Collections in the Basement Gallery*, London: His Majesty's Stationery Office, 1935, 3 (Quoted in Nielsen, 'What things *mean,*' 1).
41. Boon, *Films*, 185 ff.
42. Boon, *Films*; Farry and Kirby, "The Universe."
43. James McCloy to Leonard Miall, 18 September 1957 (BBC Written Archives Centre, folder T32/626/1 – Frontiers of Science – General) quoted in Farry and Kirby, 'The Universe,' 7.
44. Philip Daly to Aubrey Singer, 5 March 1963. (BBC WAC T14/1810 – Horizon – Pilot Programme).
45. F.A.B. Ward, "Power from the Fusion of Atoms," Science Museum Bulletin, N 9 (Summer 1959): 9–12, 9.
46. "Thermo-Nuclear weapons and Broadcasting. Note by the Director-General," 28 February 1955 (BBC WAC folder T16/150/2 – *Programme Policy – Atomic Energy – 1950–1954*).
47. See Gooday, *Domesticating*, on the introduction of electricity in the household as the taming of an elementary force. For an example of the presentation of atoms as beneficial for everyday life in the context of the Atom for Peace movement, see Zachmann, "Atoms."
48. On this particular exhibition also see Forgan, "Atoms."
49. Letter from Shaw to Ellis, 10 December 1945 (SCM ED79 file 8260b *Special Exhibition Atomic Energy 45–47*). Wilson track photographs were photographic records of the trails of water droplet particles such as protons, or electrons left behind them when traveling in a cloud chamber, a device filled with vaporized water, used to detect such particles, and invented by Charles Wilson (1869–1859). Aston's mass spectrograph is an instrument used by Francis Aston (1877–1945) to identify 212 naturally occurring isotopes of non-radio-active elements. Cockcroft and Walton's [accelerator] was the apparatus with which John Cockcroft and Ernest Walton performed in 1932 the first nuclear disintegration. Finally E.O. Lawrence was the inventor of the cyclotron, an accelerator of subatomic particles.
50. Letter from Shaw to Ellis, 10 December 1945 (SCM ED79 file 8260b *Special Exhibition Atomic Energy 45–47*). Emphasis added.
51. Barclays to Director, 6 December 1945 (SCM ED79 file 8260b *Special Exhibition Atomic Energy 45–47*). Emphasis added.
52. Forgan, "Atoms," 180.
53. See correspondence in SCM ED79 file 8260b *Special Exhibition Atomic Energy 45–47*.
54. Forgan, "Atoms," 179.
55. Letter from Shaw to Ellis, 10 December 1945 (SCM ED79 file 8260b *Special Exhibition Atomic Energy 45–47*); quoted in Forgan, "Atoms," 180.
56. SCM technical file T/1947–1994.
57. Ward, "A mechanical model," 115.
58. Science Museum – *Report of the Advisory Council for the years 1940–1951* (SCM file Z150 – *Science Museum reports – Advisory Council reports*).
59. See BBC WAC folder T14/2222/1.
60. "David Wilson leads a discussion between David Provitt, Mr. Moore and Mr. Browne", transcript, (BBC WAC folder T14/2222/1), 2.
61. Ibid., 3.
62. Another underlying theme in this program and in the coverage of nuclear energy at the time in Britain appears to be that of national (British) identity. The program under discussion here involved an American reporter questioning in a rehearsed studio conversation the two representatives of the UKEAE and the CEGB, thus staging the US in what could appear as a technological subaltern position to the United Kingdom. For a discussion of atomic power's links with ideas of national identity see Hecht, *The Radiance.*
63. Press notice, SCM file Z213/1 *Press notices 1949–1987.*
64. A further example would be the 1958 special exhibition on the Controlled Fusion of Atoms. The exhibition was organized with the UKAEA and the US information service, in the wake of the announcement that British and American scientists had achieved controlled nuclear fusion. The center piece was a one-third scale model of ZETA, the Harwell controlled fusion apparatus. One panel, devoted to explaining the thermo-nuclear reaction, read: 'To obtain useful power from fusion the reaction must first be controlled'(SCM technical file T/1958–247).

65. See for instance Goffman, *Relations*. See also Harden, "The public/private."
66. Sheller and Urry, "Mobile."
67. G. W. B. Lacey, Note, 24 April 1962, SCM nominal file 655, *Special Exhibition – Col. John Glenn's Capsule Friendship 7*.
68. K. S. Kleinknecht to H. Kendall, 3 May 1962. Entry 70; Source Files on Project Mercury; RG 255; National Aeronautics and Space Administration; Johnson Space Center; National Archives & Records Administration – Fort Worth, TX.
69. The two Vostok 1 and 2 capsules in April and August 1961, respectively, and the three Mercury Capsules Freedom 7, Liberty Bell 7 and Friendship 7 in May and July 1961, and February 1962, respectively.
70. As William R. Macauley discusses, the British Interplanetary Society was active in the interwar and immediate postwar period communicating about astronautics, and displaying models of spaceships to lay audiences in order to support claims to knowledge about the feasibility of space travel (Macauley, "Crafting the Future"). However, Friendship 7 was the first ever manned spacecraft that had actually been into space to be publicly displayed, Gagarin's Vostok 1 capsule having never been publicly shown, which to date remains the case (Lewis, "The birth").
71. Wynne, "Public understanding;" Schmid, "Celebrating Tomorrow."
72. USIA, Information for posts exhibiting col. Glenn's Friendship 7 capsule, 4 May 1962 (SCM nominal file 655, *Special Exhibition – Col. John Glenn's Capsule Friendship 7*). One can wonder about the significance of such a choice, given that Cairo is the only place on the African continent where the capsule was exhibited.
73. USIA, Information for posts exhibiting col. Glenn's Friendship 7 capsule, 4 May 1962 (SCM nominal file 655, *Special Exhibition – Col. John Glenn's Capsule Friendship 7*). It should be remarked that the USIA asked US Embassies in non-English-speaking countries to supply a translator/interpreter to mediate between the NASA technician accompanying the exhibition and foreign crowds.
74. USIS, 'Glenn Spacecraft to make Bovingdon landfall,' 9 May 1962 (SCM nominal file 655, *Special Exhibition – Col. John Glenn's Capsule Friendship 7*).
75. Griffith, *Wondrous*, 196.
76. "Results of the first United States manned orbital space flight. February 20, 1962," NASA, 19.
77. Lawrence, "Museums," 70.
78. The exhibition was designed by people of the US Information Service in discussions with people at NASA. To date, the archival material related to the world tour of the capsule in the National Archives & Records Administration (under reference Entry 70; Source Files on Project Mercury; RG 255; National Aeronautics and Space Administration; Johnson Space Center; National Archives & Records Administration – Fort Worth, TX) does not appear to contain elements related to the design of the exhibition itself.
79. Richard Johnston, Report on 18 May 1962, World Tour of Friendship 7 Spacecraft, 3. Entry 70; Source Files on Project Mercury; RG 255; National Aeronautics and Space Administration; Johnson Space Center; National Archives & Records Administration – Fort Worth, TX. The question about the West being 'ahead of the Russians' does not contradict the analysis since this very question of the balance of technological power was on every mind, and therefore was literally part of everyday life.
80. Anonymous, "Brief View Of US Space Capsule Terrestrial Snags Slow Progress," *The Times*, 15 May 1962: 7.
81. *Panorama*, 14 May 1962 (BBC) [01:26-01:36].
82. Letter from Adrian Malone to John McLeish, 24.01.1966, 1 (BBC WAC Folder T14/2239/1- *Horizon – Man in Space*).
83. Ibid.
84. "Horizon: 'Man in Space'," transcript from interviews (n.d), 1 (BBC WAC Folder T14/2239/1- *Horizon – Man in Space*).
85. Following from the analysis of this material it appears that the BBC, the Science Museum and NASA were sharing the same style of public engagement. Such homogeneity in the public discourse about the American space conquest program could perhaps also be attributed to the fact that NASA as the sole originator of primary material for public displays on the topic was 'an obligatory passage point' (Latour, 1987) and as such could control the claims about space conquest and how they were supported, so as to enroll and keep allies in line. However, the exam-

ination of the material related to nuclear energy will show that the same emphasis on everyday life can be identified, and on this topic Britain was keen on stressing its difference from the US. The homogeneity between television, the museum and NASA should not, therefore, be solely attributed to NASA's position as an obligatory passage point but can be interpreted as one characteristic of the public culture of science and technology in the postwar period revealed by the research presented in this paper.

86. "Horizon: 'Man in Space'," transcript from interviews (n.d), 1 (BBC WAC Folder T14/2239/1- *Horizon – Man in Space*.), 1.
87. "Horizon: 'Man in Space'," transcript from interviews (n.d), 1 (BBC WAC Folder T14/2239/1- *Horizon – Man in Space*.), 1.
88. Urry, *Mobilities*, 120.
89. Silverstone, "Science, Television."
90. Lawrence, "Object Lesson."
91. Boon, "Horizon."
92. The advertisement is reproduced in Stern and Stern., *Auto ads*, 117.

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