From Explosions to Explaining: a new historiography of the Science Museum Group Explainer role

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The candidate confirms that the work submitted is her own and that appropriate credit has been given where reference has been made to the work of others.

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Abstract

This thesis explores the role of the UK Science Museum Group Explainer, a public-facing role with responsibility for engaging visitors and enhancing their experience of the museums within the Group. Arguing for new recognition of the performative complexity of this role, the research is driven by the view that its significance is currently undervalued within the science museum context.

The thesis offers an original perspective on the contemporary Explainer, positioning it as the latest vital iteration in a performed science communication tradition that is here traced first, to the practices of Science Museum Guide Lecturers dating from 1924, and second, further back in time to nineteenth-century lecture demonstration practices at the Royal Institution, London. In so doing, it re-evaluates the role, challenging commonly held museum industry assumptions that the current iteration is simply a late twentieth-century customer service and education construct, and proposes a new history of its development and practice.

The interconnected Performance Studies theories of embodied knowledge transmission and intertheatricality are utilised in conjunction with the performer-training concept of vertical transmission, to inform a new interpretation of the ways in which scientific public presentation practices can be seen to have been inherited or passed on. In this way the thesis suggests a line of performance transmission from the early nineteenth to the early twenty-first century.

Highlighting performance elements within the contemporary role and its various suggested antecedents, the thesis proposes use of a new term, 'performed explaining', to uniquely describe their presentational forms, appropriately distinguishing them from the more ubiquitous twentieth-century museum industry term 'live interpretation'.

As a collaborative doctoral project the findings of this research are intended to be of particular significance to the SMG, but also the broader science museum and science centre industry. The thesis therefore concludes with recommendations for improving future practice in relation to the development of the Explainer role.

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Abbreviations

ASDC The UK Association of Science and Discovery Centres

DCMS The Department for Culture, Media and Sport

ISTC Interactive Science and Technology Centre

LEE Life-enhancing Experience

MSI The Museum of Science and Industry, Manchester

NMeM The National Media Museum, Bradford

NMSI National Museum of Science and Industry

NRM The National Railway Museum, York

OED The Oxford English Dictionary

RI The Royal Institution of Great Britain

ScM The Science Museum, London

SMG The Science Museum Group

STEM Science, Technology, Engineering and Maths

V&A The Victoria and Albert Museum, London

Chapter One

Introduction

1. Summary of the context of the research

This research has been supported for three years by funding from the Arts and Humanities Research Council through its Collaborative Doctoral Award (CDA) scheme. The collaborative relationship is with the Science Museum Group (SMG), and most specifically, the Learning department at the National Media Museum (NMeM), Bradford. Focussing on two key concerns, this thesis a) explores the live performance practices of the SMG Learning teams and b) proposes a new historiography of the key and under-researched role of 'Explainer', a public-facing role with responsibility for engaging audiences and enhancing visitors' experience of the museums in the Group.

The project has been transformed during the research process having been necessarily responsive to the fluctuations of a dynamic national institution that has itself been affected by wider economic constraints throughout the period of the research (see 5.2). Originally conceived of as a practice-led research enquiry, the project at that stage sought to explore ways in which specific performer training techniques might enhance the development of the contemporary Explainer role in the museums of the SMG. The devising and testing of a new practical performance-centred approach to the training of Explainers was intended to form the practice element of the research, supported by a written theorisation of the work. This approach was necessarily dependent upon an intensive and close working relationship with Explainers themselves, and initially a commitment to enabling my access to them on a regular basis was provided by NMeM. However, the impact of a change management programme at NMeM during 2012-14 resulted in unforeseen changes to the workload for Explainers as well as the beginning of a critical period of redefinition of the themes and direction of the Museum as it adapted to a greater Science, Technology, Engineering and Maths (STEM) focus (see 5.2.1 and 5.2.2). This shift in focus has had particular impact on the role and work of the Explainer. Consequently, the planned-for access to Explainers was withdrawn by NMeM resulting in the practice-led element being dropped from the project.

Although initially disappointing, this intervention ultimately led to the emergence of a new, rich research focus - the historical enquiry into past practices of Explainers at the Science Museum and an exploration of the roles that may be seen as its antecedents. Such an enquiry was facilitated by a blend of research methods – archival, interpretive and qualitative (see 1.2.1 and 1.2.2) – that had not been considered at the start of the process, but that with the application of specific theories from the field of Performance Studies, has resulted in the proposal of a line of transmission of performance practices spanning a period of over two hundred years. My personal interest in training methods has endured to some extent and is a theme that reappears at different moments in the thesis (see especially 2.5 and 5.5.1), and that has an impact on the conclusion in the form of recommendations for the collaborative partner (see 6.5). It is hoped that the overall findings of the research will be of interest not just to the SMG, but more broadly across the science museum and science centre industry.

Due to the collaborative nature of the research privileged access to three of the museums within the SMG, the Science Museum (ScM) itself, NMeM and the Museum of Science and Industry, Manchester (MSI), has been granted. This has afforded me access to personnel across the three museums, to organisational archival material and to grey literature such as selected committee meeting minutes, individual project plans and internal memoranda held within ScM's Documentation Centre and the SMG Registry, and also to images from the SMG photographic archive at Blythe House. Additionally, I have benefitted from opportunities to observe aspects of the museums' daily public programmes in action.

Due to my professional background, I am uniquely placed to conduct this research investigation. A theatre studies graduate and qualified secondary school Drama and English teacher with twelve years teaching experience, I changed careers with a move into museum education in January 2009. From then until September 2012, when I began this research, I was employed by NMeM in a full-time capacity as the Learning Programmes Coordinator for Schools and Colleges, a middle level position with responsibility for, amongst other things, managing Explainers. Explainers are the members of staff who deliver a wide variety of activities for audiences as part of each museum's public programme, and the role is of central importance to this thesis. My interest in the Explainer role developed from an increasing belief that its complexities, notably in terms of the multiplicity of presentational modes that it utilises, were not fully understood or recognised. I was also interested in the ways in which, particularly in the later stages of my employment, Explainer practices at the SMG satellite sites began to be increasingly shaped by those at ScM. This in turn led to my consideration of notions of lineage, inheritance and the passing on of traditions. My previously held position has enabled me to develop a distinct perspective on the both Explainer role and the SMG, informed by a combination of experiential insight and the critical approach of research scholar. The collaborative nature of this project combined with my previous professional relationship with the SMG, and especially NMeM, has necessarily resulted in a particular attitude and I have attempted at all times to 'sit outside' of the organisation, challenging my own pre-existing attitudes towards it. It has also been necessary to re-negotiate existing relationships with former colleagues, particularly Explainers at NMeM, where our professional relationship shifted significantly from that of manager/line-report to student/subject.

1.1.1. Research rationale

ScM, and by extension the SMG, has been the subject of several accounts of its own history, most notably *Science for the Nation* (Thompson 2010). This edited collection of essays exploring various perspectives on its distant and more recent pasts was published to coincide with the centenary of its independence from the South Kensington Museum in 1909.[1] Others are former ScM Director David Follett's 1978 publication *The Rise of the Science Museum under Henry Lyons* and *The Science Museum: the first hundred years* (Morrison-Scott 1957) both of which focus on the development of its buildings and collections. These publications focus on constructing a narrative that valorises the cultural significance of the Museum, charting and celebrating its successes in its shaping of the public's understanding and appreciation of science and its many applications. In addition they concentrate on its senior figures. Noticeably absent is any meaningful attention paid to the diverse and evolving ways in which the Museum utilises people to interpret, explain and enhance its objects, themes and stories, both historically and in the present. To counter this bias towards buildings and senior staff, this research is specifically focussed on the role of the SMG Explainer, the member of staff with a direct responsibility for the face-to-face engagement of audiences, as well as on the following range of other roles that I identify here for the first time as Explainer antecedents:

1. the **Guide Lecturer** first appearing in 1924 and representing the first real attempt to engage audiences at the ScM through the live person
2. the Science Club **assistant** operational between 1960-62
3. the Discovery Room **helpers** in use from 1981-83
4. the Test Bed **assistants** present from 1984-86
5. the Launch Pad **gallery assistants** in action from 1986 when Launch Pad first opened, and so-named up until some time around the late 1980s when the term 'Explainer' began to be used

I argue that each of these role functions represents a critical stage in the evolution of the SMG Explainer role as it is known today. All of them, with the exception of the Guide Lecturer (Boon 2010: 115; Follett 1978:103-105), have been lost in accounts of the Museum's history and their central contribution to the development of its live, person-based interpretation therefore overlooked. As discussed later in this introduction (1.4.4), I use a new term, 'performed explaining', to describe the variety of methods with particular performance-

[1] The nascent years of the South Kensington Museum/ScM are briefly explored in Chapter 3 (3.2).

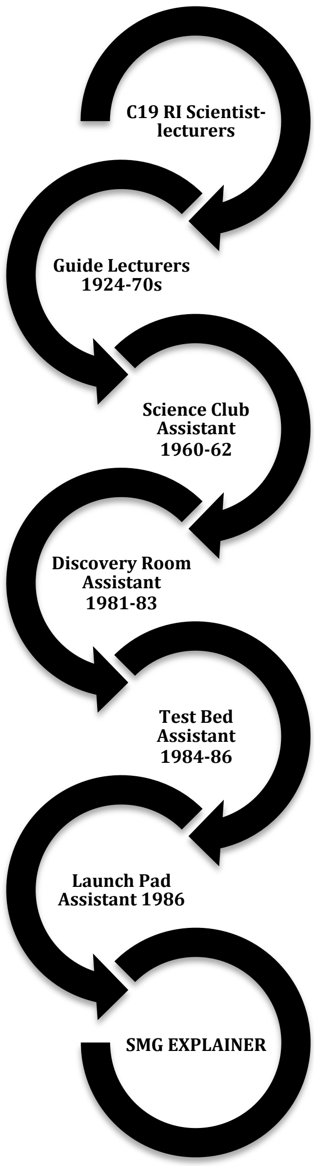
focussed characteristics, that are adopted by Explainers and certain of the antecedents in the pursuit of explaining collections and their themes for audiences. More usually, and as I argue, less accurately, this aspect of Explainer work is categorised as 'live interpretation' (see 1.4.2). The new term, as will be shown, gains currency as the role moves through the various iterations I have identified and is established as being of particular relevance to contemporary practices.

In today's museum hierarchy the Explainer role is considered a relatively low-grade one, yet other roles that I argue here should be regarded as its predecessors, have sometimes enjoyed an apparently more elevated status. For example, the Guide Lecturer role established at ScM in 1924, features on an audit of 'Senior Staff 1893-2000' (Morrison 2010: 324-328) alongside such high-ranking roles as Museum Directors, Chief Curators and Heads of Collections.[2] How is it that perceptions of the status of the Explainer role have come to be downgraded over time given the relative importance of the job they do – a role that, as one former Learning Manager from NMeM observed, has the 'ability to make or break a visitor's experience of the museum' (MGR1/NMeM/15)? One function of this research is to explore this shift in perception and status from the previously overlooked perspective of a lower ranking role alongside aspects of the cultural and historical development of ScM. In addition to the presentation of current SMG Explainer performed practices and an investigation into the evolution of the role during the twentieth century within ScM, this thesis argues for the location its roots even further back in time. It suggests external roles and practices - notably nineteenth-century lecture-demonstration practices as evidenced in the work of three scientists at the Royal Institution (RI), London - that can be seen as having influenced its development. Importantly, I identify for the first time the significance of a tangible connection between the public presentation practices at the RI and the public presentation work at ScM, when in 1954 its Guide Lecturers were sent to observe the RI work in action. Using certain frameworks of theatre and performance historiography this thesis

[2] I am grateful to Tim Boon for the observation that the names of Guide Lecturers on this list might possibly have been added simply because the complier did not know where else to include them. The Guide Lecturer role is explored in detail in Chapter 3.

argues for the construction of a line of descent from Humphry Davy's RI lecture-demonstrations at the beginning of the nineteenth century, to the SMG Explainer at work in the early twenty-first century. An equally important element to this research is the examination of the Explainer role and its presentational activities from a performance perspective, an association that, perhaps surprisingly, has not been explicitly made before. Thus, there are two core strands to the research:

a) The construction of a new lineage that traces the roots of the contemporary SMG Explainer role back to RI nineteenth-century lecture-demonstration practices. Beginning with the historical perspective the thesis locates the roots of the Explainer role in some of the earliest forms of public science communication and the lecture-demonstration practices as evidenced in the work of three pioneer scientists at the RI. It moves in subsequent chapters to illustrate how a variety of lecturing and educational roles can be seen as distinct stages in the development of the contemporary Explainer role. Diagrammatically, the Explainer role lineage that I construct can be represented thus:



(*Figure 1.1*) Representation of Explainer role lineage from 19th-century to present day[3]

b) An exploration of the ways in which an understanding of the presentational work of the Explainer role, its antecedents and RI scientists over the last two hundred years or so can be enhanced by critical theories from the fields of theatre and performance. Performance-based readings of these practices facilitate a deepening of perceptions of the role and function of those who deliver them, particularly in the case of the more contemporary models, and the thesis reflects how this

[3] This diagram is used throughout the thesis in order to illustrate how each chapter contributes to the next section of the lineage.

emphasis can be seen to fluctuate at different moments in the development of the role.

1.1.2 Value and currency of the research

The broader contextual backdrop against which this research has been conducted has witnessed an unprecedented period of change in terms of government priorities and leadership. The UK government deficit reduction programme (austerity), introduced by the Conservative-Liberal Democrat coalition government in 2010 resulted in intensive and on-going spending reviews across public services with the museum and heritage sector experiencing extensive cuts in funding.[4] As a consequence, the SMG has undertaken a change management/restructuring programme that has had significant impact on personnel and practices across all its sites (see 5.2). The contemporary aspect of this research is thus set against a redefinition and new direction for the SMG (see 5.2) and this context of change and transition is highly significant when exploring its impact on the provision for the Group's public programmes. As a dynamic institution continuing to respond to ongoing demands in the current climate of economic contraction, a written account of aspects of the SMG is unlikely to remain complete and wholly accurate for any length of time. At NMeM for example, the Learning team have been managed by four different Heads of Department, with variously changing job titles, during the period of research (September 2012–December 2015), a situation that has contributed to feelings of insecurity and instability within that team. The following comments, for example, from interviews with NMeM Explainers reveal some of their concerns

> I feel like I've come into it quite recently where there's a lot of unease and uncertainty about what's going on, so I imagine, well it seems that that's put a lot of projects and planning and development on hold generally. (EXP4/NMeM/13)

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[4] The deficit reduction policy was introduced in response to the financial crisis of 2008 and 2009 that 'exposed an unstable and unbalanced model of economic growth in the UK, which was based on unsustainable levels of public and private sector borrowing' (HM Treasury: 2015).

> We've not been on a firm footing for a year, and that obviously it does have an impact erm on development, on … you know, and also just on your sense that when we start discussing a new project or something that's new that's going to happen, a big part of me *now* is like, 'no it's not'. (EXP5/NMeM/14)

> The job description pretty much…it's changed now, obviously the job's, it alters as we go along (…) I hope it doesn't change drastically, cos that'll make a lot of people leave I think. (EXP2/NMeM/13)

All attempts to depict the contemporary SMG picture throughout the thesis are offered as true representations during and up to the culminating period of this research. In this way, the research offers a unique insight into some of the learning-led performed interpretive practices of a major UK cultural institution at a time in its history of substantial change. Expectations and definitions of the Explainer role, especially at NMeM and MSI, have been transformed during the research period and this study therefore captures views of its recent iterations before they are replaced and lost. A critical account of the development of the purpose and practices of the role from a performance perspective makes a particularly timely contribution to the field.

Due to the collaborative nature of this research potential impact for the SMG, and particularly NMeM, has been a key consideration. This research provides the first extended study of the Explainer role specific to the SMG and of the function of performance as practiced by Explainers within its museums in its present and past history. While there is recognition of the value and importance of the Explainer, or variously similarly titled roles within the field of science communication, comparatively little research has been undertaken in order to discover its impact (Rennie and McClafferty 1996: 76) and this thesis provides some countering of this shortfall. Significantly, this research constructs a lineage from nineteenth-century science lecture-demonstration practices to contemporary Explainer practices that has not previously been suggested and this may contribute to a new understanding and valuing of the current role, as well as shedding light on past practices. Investigation into historic and contemporary Explainer practices is also recognised by archival staff at the ScM as being of importance, since 'a history of the Explainer department does not exist' (Cook: 2014). Thus, a further significant function of this research is to offer a new industrially relevant historiography of the development of the role. For the collaborative partner organisation, and most particularly for NMeM where the Explainer role is least developed and invested in, this may usefully impact on the development of future training and presentation practices, as well as potentially inform a revaluing of the role itself. The final section of the thesis conclusion (6.5) identifies a series of recommendations for consideration by the collaborative partner as well as suggestions for further related research. Additionally, impact for the collaborative partner has been planned for through a seminar with Explainers and Learning managers at NMeM, to raise awareness of the research findings and recommendations and to contribute to discussions concerning the development of its Explainer role as it progresses with its adoption of a STEM (Science Technology Engineering and Maths)-focused programme (see 5.2.2).[5] This provides one example of how the research can be regarded as having a tangible bearing on aspects of current industry practice.

Although there is a general interdisciplinarity to this research it resides mainly within the fields of Performance Studies, Performance Historiography, Museum Studies and Science Communication, and it is anticipated that it is likely to be of particular interest to scholars in these disciplines.

1.1.3 Research Questions

The investigation is driven by two principal research problems, each of which relates directly to the aforementioned core strands (see 1.1.1), and is supported by three subsidiary questions. At different points throughout the thesis the focus will weigh more heavily on either one or other of the two principal problems and the tone of the chapters shifts between the historical, and therefore necessarily more speculative attempts to address research question one, and the examination of performed explaining practices through the lens of performance (research question two). Chapters 2, 3 and 4 concentrate on historical practices while Chapter 5 presents perspectives on current Explainer practices. The subsidiary questions broadly serve to focus the discussion,

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[5] This seminar was led by me on October 13 2016 at NMeM.

facilitating a sense of comparison across different periods in the lineage in order to establish how each stage has contributed to the current Explainer role. The emphasis on the research questions shifts with each chapter, and the core questions for each chapter are identified in each introduction.

Principal Research Problems

- What are the origins of current performed explaining in the SMG and what traces are evident from the practices of science lecture-demonstration in the nineteenth and early twentieth centuries?
- What does a critical lens of performance analysis offer to an understanding of science lecture-demonstration and performed explaining in the period 1802-2015?

Subsidiary Research Questions

1. What does a focused analysis of the role of the Explainer and its antecedents reveal about the historical and cultural development of the Science Museum and Group?
2. What are the shifting attitudes of the museum industry to the role of the Explainer and its antecedents in the period?
3. How do conceptions of expertise, value and status play out in this sphere?

1.2. Research Methodology

The chosen research methods explicitly blend historiographical and archival methods alongside more qualitative approaches. This has enabled me to select and interpret relevant extant documentation from the archives of the two key organisations – the SMG and the RI – and to locate the official or institutional perspectives that are presented. In the case of the SMG this view was expanded through the scrutiny of a range of more recent and contemporary documentation. Through my own direct observations, questionnaires and interviews with SMG employees past and present I have been able to compare and contrast institutional perspectives with personal responses and views. In the following two sub-sections I will detail first, the qualitative research methods that I have used, and second, the historiographical methodologies that have influenced the theoretical and philosophical aspects of the research, offering examples of where my practice maps onto the theory.

1.2.1 Qualitative Research Methodology

Three museums from the SMG were chosen as foci for the contemporary research presenting opportunities to contrast and compare expectations of the Explainer role. NMeM is the principal collaborative site for this research and therefore most ready access to learning team personnel was obtained at this site. Inevitably, knowledge and perceptions of the Explainer role at this site were also influenced by my previously held professional role involving the line management of Explainers. I acknowledge that this earlier relationship might also have affected Explainers' responses at NMeM during my interviews with them and this was one of the justifications for using an anonymous online questionnaire format when I gathered supplementary evidence towards the end of the research period.[6] For these reasons the focus in Chapter 5, which explores contemporary perspectives, is weighted towards a presentation of the role as it exists at NMeM. It was not possible to undertake the same level of observation and interviews at the two other sites, and particularly in the case of Explainer work at ScM, some supporting evidence was sourced from my experiences as a previous employee.[7] The impact of the change management programme at NMeM during 2011-2015, combined with the shift in focus towards STEM-themed activities (see 5.2.2), resulted in several significant changes in the ways in which Explainers and performed explaining were used during the research period. This was particularly evidenced by the removal of certain shows and gallery talks that had previously been core components of the Explainer

[6] Only 6 responses from NMeM were forthcoming using this method despite repeated attempts to gain assistance from learning personnel.

[7] In July 2010, in my capacity as NMeM Learning Programmes Coordinator for Schools, I spent 5 days working at ScM with the Explainer team in order to learn about their training, induction and presentation practices. I spent a further 3 days there in October 2011 observing their practices in training Explainers to deliver the science show *Flash Bang Wallop!*

repertoire for several years, and a period of transition that saw Explainers learning several shows for short-term delivery only.[8]

Specific research methods used were:

- **Non-participant observations** of a) the delivery of a range of SMG performed explaining activities at all three sites and b) of Explainer training and induction activities where available at NMeM.
- **Face-to-face semi-structured interviews** with current SMG Learning managers, Explainers and Explainer team leaders at NMeM and MSI. These were pre-arranged and conducted in a museum office (NMeM), and museum café and performance space after the show (MSI). Participants were not familiarised with the questions prior to the interview although they were made aware of the research focus. The flexibility of a semi-structured approach with open format questions allowed for the interviewee to expand on areas that were of particular interest or importance to them. It also allowed me to adjust the sequence of questions as necessary and to make some additions depending on the direction of the discussion. Explainers and managers were broadly asked the same set of questions with a few minor differences that reflected their different roles. Each interview lasted approximately one hour and was recorded and then transcribed by me.
- **Face-to-face semi-structured interviews** with former SMG Learning managers and Explainers from NMeM. These were pre-arranged and conducted in a café and in the home of one interviewee. Interviews were recorded and transcribed by me.
- **Face-to face unstructured interview** with current ScM Explainer trainers. These took place in the learning spaces at NMeM during breaks in the 2-day training of NMeM Explainers to be able to deliver the interactive storytelling session *The Not so Sleepy Hedgehog*. On day 1 I

[8] Examples include the permanent removal of *Cinemamagic*, an interactive show about the history of special effects in film, and the gallery talk *Photography in Victorian Times*; the learning of a new storytelling session *The Not so Sleepy Hedgehog*, imported from the ScM in January 2013, to be removed in June 2014.

took handwritten notes during the discussion; on day 2 I recorded the discussion and transcribed it afterwards.

- **Telephone semi-structured interview** with a former SMG Learning manager from ScM. I recorded the conversation and then transcribed it.
- **Face-to-face unstructured interviews** with curatorial and research staff at ScM. These were conducted in the museum café and Documentation Centre. One interview was pre-arranged, recorded and transcribed (research manager); during the other, which was impromptu and quite brief, I took handwritten notes. The latter conversation was followed up with several email conversations and the member of staff providing written responses to specific questions.
- **Online questionnaires** where interviews were unavailable or impractical. At NMeM separate questionnaires were devised for Explainers and Learning managers. The link was sent to the Explainer team leader for dissemination and Explainers were encouraged by managers to complete it during their working hours. A separate questionnaire was devised for former and current Explainers at ScM and this was shared on their closed Facebook group alongside a summary of the research project and an invitation to participate. The benefits of this method were that responses were anonymous and transcription was not necessary. Drawbacks were the lack of opportunity to draw out potentially relevant and interesting responses from interviewees, encouraging expansion where necessary.
- **Academic Literature Review** relating to the fields of: Performance Studies, Theatre Studies and Museum Studies; Theatre and Performance History and Historiography; Science Communication; History of Science.
- **Industry Literature Review** of relevant grey literature; institutional policy documents, reports, audits, strategic ambitions, business plans, mission statements, marketing materials.
- **Visual/oral documentation** stills photography and video recordings (of Explainer practice at NMeM and MSI, and training sessions at NMeM); stills photography (of sites); voice recording (of all interviews); transcriptions of interviews.

In order to protect participant identities and for ease of reading, when using material directly quoted from interview transcripts or online questionnaires, I have substituted any names used by the participant where they have specifically referred to a colleague. This only occurs in Chapter 5. Additionally, when transcribing and presenting interview material I have used the following devices:

> … to indicate a pause in the participant's speech
> (…) to indicate where I have edited material from their response

When using contributions from multiple participants with the same role I have adopted the following coded format for identification:

> Professional role and participant number/SMG site/year of interview e.g**. EXP1/NMeM/14** identifies **Explainer 1 at NMeM**, interviewed in **2014**

Other codes used for roles are: MGR for Manager and EXTL for Explainer Team Leader. In two instances the participants are named, with their consent, since although they are currently employed by ScM, their contributions relate to their experiences and memories of historic practices from their early employment rather than contemporary practices and events.[9] My analysis of interview transcripts and online questionnaire responses was conducted through a process of carefully sifting and gathering material under the following key headings: Explainer perceptions of role; branding of Explainer role; impact of change; impact of STEM; performance skill; status of role; training; transmission; future challenges. I was then able to assess where, what and how material was useful to the thesis.

Ethical considerations were observed in accordance with the University of Leeds guidelines and the research proposal was passed by the Arts and PVAC Research Ethics Committee (ref. LTPCI-010). All face-to-face and telephone

[9] These are Dr Tim Boon, Head of Research and Public History and John Liffen, Curator of Communications.

interviewees were informed of the purpose of the research prior to the interview and gave their written consent for their responses to be used. In addition they were supplied with my email address and notification that they were able to withdraw their responses at any time up to submission of the thesis. Participants were informed that any responses used in the final thesis would be presented anonymously but that their role would be identified. A notice containing the same information appeared on the final page of all online questionnaires. Where observations and photographs of school groups engaged in Explainer-led sessions were taken (NMeM) prior written consent from the schools was obtained. With regard to observations and photographs involving the general public it was deemed impractical to obtain fully informed consent, but as the activities were taking place in public spaces and subjects were anonymous this was considered to be ethically acceptable.

In accordance with the stated intentions for ethical review all data has been stored securely on my password protected home computer and memory stick. Additionally, signed consent forms, any handwritten observation notes and the codes identifying specific individuals as each anonymous participant are stored securely in my home office.

1.2.2 Historiographical Research Methodology

In his *Introduction to Theatre Historiography* (2009), theatre historian Thomas Postlewait exposes some of the problems associated with a simplification of the term 'historiography'. The *OED* offers just two rather broad definitions that perhaps point to some justification for Postlewait's concern:

> **historiography** *n.* **1.** The writing of history; written history. **2.** The study of history-writing, esp. as an academic discipline.

Arguing for a more expansive use of the term Postlewait states that, 'Although the word *historiography* evokes the writing methods of historians, it has come to mean much more, including the theory and philosophy of history' (Postlewait 2009:2 italics in original), before going further to suggest that writers are not always clear in their uses of either of the terms *historiography* or *history.* Rebecca Schneider's analysis of the *OED's* multiple definitions of the word *history* concludes that it arguably embraces two separate and distinct meanings: what actually happened and the 'record or narrative about what happened' (Schneider 2014: 15). This second notion in itself raises some important considerations regarding the recording of past actions and events. Contemporary scholars of history, and performance history, agree that in focussing any enquiry onto events of the past it is essential to accept that history is not the product of one single account or version (Schneider 2014; Mangan 2013; Gale and Featherstone 2011; Postlewait 2009; Zarrilli et al 2007; Bratton 2003; Steedman 1998). As Postlewait, citing philosopher Raymond Aron observes, 'the plurality of interpretations is an incontestable fact, which the historian must accept' (Postlewait 2009: 6). Multiple truths, versions and accounts of events are considered alongside cognisance of the social, cultural and political contexts surrounding that event and an *interpretation* may be offered. Michael Mangan's observation that a twenty-first-century understanding of approaches to history is 'something in which the certainties of cause and effect are replaced by multiple stories with unexpected gaps, leaps, flashbacks and repetitions, which interweave in unpredictable ways' (Mangan 2013: 84) is helpful with respect to the approach taken in this thesis. Useful too is Jim Davis' suggestion that performance history:

> arguably comes alive at the moment when careful scholarship and detailed research merge with imaginative speculation to ignite a creative yet informed response to live events that may have occurred either in the immediate or distant past.
>
> (Davis et al 2011: 97)

These views intersect with what Carolyn Steedman refers to as a 'politics of imagination' (Steedman 1998: 73), the ways in which researchers have to capitalise on their ability to speculate, suggest, or to guess in order to fill in the gaps when writing history. Indeed, Postlewait (2007: 203) lists a series of 'weasel words' or, less critically, 'qualifying phrases', acknowledging that the historian must sometimes employ them in order to construct their argument based on the negotiation 'between matters of possibility and plausibility': it seems likely; this would seem to suggest; common sense dictates; it is plausible that; surely they intended. This observation is particularly helpful in terms of my own approach. In accepting that history is in essence a narrative form (White: 1978) grounded in actual events, there is acknowledgement that the writer must utilise various narrative phrases and devices in order to present a particular argument or viewpoint, and this thesis makes use of them at different moments. This is most particularly evident in Chapters 3 and 4 where the focus is on the exploration of past roles in ScM's lecture and education service in order to suggest their contribution to the development of the Explainer role.

Noting Postlewait's criticism of writers who do not make explicit enough their own uses of the words history and historiography, I shall explain my own approach. In this thesis my use of the term historiography is most closely affiliated to the *OED's* first definition and I use it to define one of this thesis' core functions: to provide a written version of a history of the SMG Explainer role. As already articulated, little, if any, research has been undertaken into the role and in order to establish a possible lineage I have examined previously existing roles that bear strong similarities in terms of function, purpose and method. In this historiography I present perspectives on those earlier roles that enable views of them to be associated with contemporary practices. In this way, I suggest not only a lineage of the Explainer role, but also new interpretations of its predecessors examined with the benefit of the passing of time. In their day ScM Guide Lecturers, for example, were not thought of or intended to be a stage in the development of some other role, but looking back from the perspective of almost one hundred years after the role was first established, through careful examination of the ways in which that role developed and the application of a 'politics of imagination' I am able to present them as such. US historian Alice Kessler-Harris describes the past as a 'moving spectacle' (Kessler-Harris 2011: 3), it is not fixed but changes each time a new historian, shaped by their own context and time, re-examines it. Shaped by a twenty-first century context that has seen science interpretation and science education influenced by increased pressure for engagement, entertainment and interaction, I am able to take a performance-centred perspective as the focus for my exploration of the contemporary Explainer role and its predecessors. A future researcher with an interest in the role may of course, explore its history from an entirely different perspective.

The word history, as Schneider suggests, may have multiple meanings and nuances, but my use of the term relates most closely to the notion of a narrative about specific events, practices and actions that have already happened (Schneider 2014: 15). Using the available data and solid documentary evidence, acknowledging that it is incomplete and itself derived from numerous sources and perspectives, I 'reconstruct' (Reinelt and Roach 2007: 192) or 'remake' (Gale and Featherstone 2011: 20) certain elements from the past in order to construct one particular narrative that ties them together. Postlewait provides a helpful and lengthy explication of his own fourteen definitions or applications of the term history (2009: 3-5). In conducting this research, my interest is primarily in the first four of these applications and processes of historical enquiry, and my methodology maps onto them thus:[10]

Postlewait Definitions (2009)	**Research Methodology**
1. Events that actually happened in the past – this may include the very recent past	A focus on the actual events and periods of: a. Lecture-demonstrations at the RI given by Humphry Davy (period 1802-1821); Michael Faraday (period 1821-1867) and John Tyndall (period 1867-1887) b. Presentation work of the Lecture Guides at ScM (1924 – c.1977) c. Introduction of the Explainer at ScM and their role within the Launch Pad gallery (c.1986) d. Contemporary Explainer role

[10] The remaining ten cover history as: basic historical report; descriptive historical report; study that prioritizes historical data; narrative fiction/literary essay; histoire – combination of fiction and history; academic discipline; discourse; conceptual foundation for other disciplines; science disciplines as studied from historical perspective; mode & method of knowledge for all fields.

	within three sites of the SMG and associated performed explaining activities (2009-15)
2. Existing records for events that happened in the past. These may be written or pictorial and housed in a physical archive, or they may exist in less tangible environs, in 'people's memories, stories, songs, and cultural documents'	Use of a range of records and evidence including but not limited to: a. Published biographies and historical documentation of the key figures and two central organisations, the RI and the SMG b. Personal letters, diaries and lecture notes held in the archive of the RI c. ScM correspondence and internal newsletters and documents c.1940-1989, and a series of files relating to the Education Service 1979-1989 held in ScM's Documentation Centre d. Museum correspondence and documents held with SMG Registry and Learning departments e. Photographs of ScM practices c.1950-2000 held at Blythe House f. Online archival material e.g. the National Archives/Discovery, AIM25 g. First-hand empirical evidence gathered through observation and interview
3. The act of investigating these records	Research processes include: a. Critical review of archival material b. Use of research questions to guide the investigation and information seeking process c. Analysis of findings in relation to research questions and critical context

4. The final account provided by the historian or researcher. This may take one of several forms including a written document, thesis or report, film, photo-montage or web document	The production of a final thesis

All attempts to consider past events and practices must necessarily adopt some overarching organisational form of segmentation or periodisation (Fischer-Lichte 2014; Postlewait 2009; Zarrilli et al 2007). Taking the notion of 'freezing a segment of time and giving it an identity' (Postlewait 2009: 157), the overall shape of this thesis follows a diachronically ordered sequence that separates events and, more particularly, practices, into specific and divided sections:

- **Chapter 2: 1802-1887** – explores the lecture-demonstration practices of three significant scientists at the RI. The defined period broadly encompasses their active lecturing years.
- **Chapter 3: 1909–c.1980** – explores the introduction and development of person-based interpretation, specifically the role of the Guide Lecturer, at ScM. The defined period begins at the point of the formal establishment of ScM and concludes when the lecture service began to be replaced by less formal methods of audience engagement.
- **Chapter 4: 1960– 2000** – explores the growth of participatory approaches to science interpretation and education at ScM. The focus is on the development of certain specific 'assistant' or 'helper' roles in the various experimental activities undertaken at ScM as it developed its strategy and approach to audience engagement in response to advances in wider science communication practices.
- **Chapter 5: 2000-2015** – explores contemporary Explainer practices in three of the museums of the SMG.

The temporal scope of the thesis is large, spanning some two hundred and thirteen years, and it is therefore not possible to explore broader contexts within these defined periods in any significant depth. However, there are elements of each chapter that operate synchronically, particularly in Chapter 4 where I consider the impact of events occurring simultaneously in the UK and the US. The rationale for my choices to segment Chapters 3-5 as I have is influenced by the cultural shifts that were occurring within ScM's education approach, marking periods of change from didacticism to learning facilitation. Each chapter presents a detailed scrutiny of the various roles that I propose as Explainer antecedents. Chapter 3 also details a pivotal moment in this Explainer historiography, and explores the specific circumstances in September-December 1954 when ScM Guide Lecturers and scientist-lecturers at the RI were briefly brought together.

Tim Boon, Head of Research and Public History at ScM observes in his historical perspective on science engagement that, 'It is easiest to look at science communication historically through particular media in each period. Books, for example, leave more tangible traces than popular lectures' (Boon 2006: 8). As previously described, this research enquiry follows a historically organised route and a particular defined progression through the periods, but, countering Boon's suggestion of the ease of discovery of the written or recorded word, seeks also to explore some of the less tangible evidence from the past. Such an approach necessarily makes transparent certain potential methodological problems. For example, the evidence I seek may not always be there – this is particularly true when exploring live presentation and performance given the ephemeral nature of the act; the establishment and contents of an archive may follow the specific interests of the archivist and as such is unlikely to offer a complete picture; speculation is inevitable, for example when seeking to map eyewitness accounts onto a specific nineteenth-century lecture; personal bias may be present in the re-telling or representation of an event or a life. Carolyn Steedman observes how:

> The Archive is made from selected and consciously chosen documentation from the past and from the mad fragmentations that no one intended to preserve and just ended up there (…) And nothing happens to this stuff, in the Archive. It is indexed and catalogued – though some of it is unindexed and uncatalogued, and parts of it are lost. But as stuff, it just sits there until it is read, and used, and narrativized.
> (Steedman 1998: 67)

This is particularly true of one of the key sources used in this research the SMG's 'Z Archive', where the contents are loosely gathered in broadly related sub-sections with no overarching curatorial concept or policy.[11]

UK theatre historians Gilli Bush-Bailey and Jacky Bratton (Bush-Bailey and Bratton: 2011) have described their own practice of 'doing history backwards' (2011: 103) in relation to the work of Mark Franko and Annette Richards' (2000) interpretation of Derrida's use of 'mark' and 'trace'. Where Derrida applies these terms to the continuing power of language to communicate meaning long after the original utterance has occurred and the speakers are gone, Franko and Richards extend this idea into the notion of embodied performance studies:

> Traces may fade completely, but marks tend to remain, like scars, yet without immediate reference to the present. Performance studies need to consider, and to interpret, that which remains, persists, and returns.
> (Franko and Richards in Bush-Bailey and Bratton 2000:5)

One important aspect of this research locates the returning marks and traces of nineteenth-century live science lecture-demonstration practices in contemporary Explainer practices, although unlike the methods of Bush-Bailey and Bratton, Franko and Richards, I follow a more conventional chronological path.

1.3 The Science Museum Group: contemporary context

This brief section provides a contextual summary of the SMG. More specific detail regarding each of the three museums highlighted within this research, and particuarly with reference to their learning provisions and their use of Explainers, as well as an outline of the impact of changes to content, programming and staffing as a result of recent austerity–induced financial cutbacks, is presented in Chapter 5 (5.2). It is my intention here simply to

[11] This view was confirmed by Tim Boon where he described how the Z Archive was never 'built as a formal archive, it was stuff that curators kept' (Boon: 2014).

provide a broad introduction to the current state of the collaborative partner organisation.

The SMG describes itself as 'world-beating' (Science Museum Group 2015a: 1) and comprises five separate sites across the UK: ScM (lead partner); NMeM, Bradford; MSI, Manchester; the National Railway Museum, York (NRM); and the National Railway Museum (Locomotion), Shildon. Additionally it makes use of two major object stores: one at Blythe House in west London, a space shared with the Victoria and Albert Museum and the British Museum, holding over 170,000 SMG small objects; and another at Wroughton, near Swindon comprising seven aircraft hangars housing large objects not currently on display in the museums.[12]

As National Museums, the Group's most substantial portion of funding is received as grant-in-aid from the Department of Culture, Media and Sport (DCMS). In addition the Group receives financial support from sponsors, grants and foundations as well as an increased focus in recent years on boosting trade income and visitor donations.

Although each Museum has its own identity and ambitions they are united by a common SMG mission and vision that since 2011 have been:

> **Mission**: Our Museums share a mission to engage people in a dialogue about the history, present and future of human ingenuity in the fields of science, technology, medicine, transport and media.
> **Vision**: To be internationally recognised for our creative exploration of how science, innovation, and industry created and sustain modern society.
>
> (Science Museum Group 2015c: 1)

The SMG Annual Review 2014-15 reported that total attendances for all its Museums that year was 5,712,000. ScM itself claimed the largest portion of

[12] At the start of 2014 Blythe House came under scrutiny from DCMS as it began assessing the cost-effectiveness of its expensive central-London location. In the Government Spending Review of November 2015 Chancellor George Osborne confirmed that £150m had been allocated to enable the permanent removal of all storage from Blythe House.

these with 3,342,000, of which 442,000 visitors came in educational groups, making it the most-visited museum in the UK by education groups. The Learning provision is then a significant element of the SMG's offer and it positions itself as having a central role to play in contributing to the UK Government's aim of increasing pupil take-up of STEM subjects (Science Museum Group 2015c: 3).

1.3.1 Defining the role of the SMG Explainer

In this section I offer a short introduction to the role of the contemporary SMG Explainer. Although this role is only featured in Chapter 5 it is critically important to the overall shape of the thesis and as such demands clarification from the start.

Of the *OED's* twelve definition entries for the verb explain, three are particularly useful in uncovering the essence of the Explainer role:

> 2b To make plainly visible; to display
> 3a To unfold (a matter); to give details or enter into details respecting
> 3b To make plain or intelligible; to clear of obscurity or difficulty.

Together, these three point to the key purpose of the SMG Explainer role. The role is located within the SMG's Learning provision and at its most fundamental operational level its core function is to assist audiences in their understanding of information that is connected to the objects and themes of the museums – the way things work, how they came to be, the scientific causes of their invention, for instance. Explainers also help to ensure that visitors have an enjoyable experience. In essence the role is concerned with making plain the workings and concepts behind the content and collections of the museums. Approaches embrace constructivist learning theories, with the visitor (learner) situated at the heart of the experience, and Explainers provide opportunities for them to engage with concepts and artefacts through active experience and interaction.

Each of the three museums featured in this research has a differently worded summary of the Explainer role, evidenced in each internal Job Description, but the essential requirement is broadly the same:

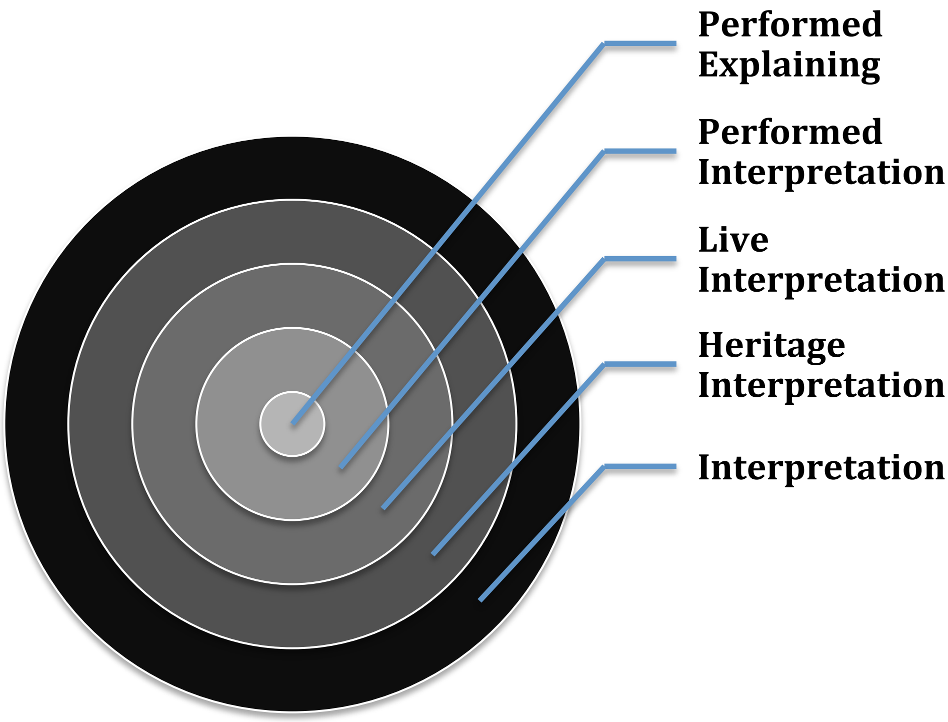
- **ScM**: To deliver high quality educational events and interactions in the interactive galleries for a broad range of audiences and occasionally within schools and communities. (JD 2010)
- **NMeM**: Explainers educate, entertain and inspire visitors, interpreting and communicating information about the museum's subject matter in unique, engaging ways. (JD 2009)
- **MSI**: To motivate and inspire our visitors through the delivery of high quality life-enhancing learning experiences that are inspiring, engaging and memorable to a wide-ranging audience, including the delivery working machinery demonstrations, workshops, tours, science shows, story-telling and costume characters. (JD 2013)

Current industry assumptions identify it chiefly as an educational role with customer service elements, and within the museum industry it is largely considered to be an entry-level post, often requiring modest demonstrable experience – for example, 2013 SMG Explainer salaries were listed at £15,551 within London, and £13,343 elsewhere (AMJ: 2013). At all sites in this study Explainers work with audiences of all ages, although my interest here is specifically in their presentational work for families and school groups. Explainers use a diverse range of presentational forms in order to assist enhanced appreciation and understanding of museum themes and objects for these audience groups, including: storytelling, live gallery shows, science theatre shows and demonstrations. In addition, all three sites use Explainers to lead interactive workshops that usually involve participants in the construction or creation of a tangible product to take away ('make and take' workshops). A key feature of this research (Chapter 5) emphasises the performance-focussed nature of many of their delivery modes and I explore the tensions between the role's real and fictionalised worlds (see 5.4.1). Furthermore, I argue that the SMG Explainer role can be understood as a complex hybridisation of self-expert-character-facilitator (see 5.4.2), functioning in a far greater multidimensional way than has previously been considered. In seeking to augment current perceptions of the role I suggest a re-valuing of its contribution to the overarching aims of the SMG and recognition of its broad capacity for impact on the visitor. My location of the Explainer role as the current iteration in a lineage that extends back to nineteenth-century RI scientist-lecturers enhances notions of tradition and inheritance, contributing significantly to my assessment that it extends beyond the confines of customer service and education.

A new interpretation of the role leads to fresh consideration of its purpose, and as such, I propose a new term, 'performed explaining', to describe certain of the activities undertaken by SMG Explainers. This term is used when discussing their live presentation work in this thesis. I separate *performed explaining* from activity that can be regarded as *facilitative* i.e. workshop sessions and 'make and take' drop-in sessions. These activities rely more on the Explainer's instructional and organisational skills rather than on their facility as performers. As is explored in the following section this new term builds on current understandings of 'live interpretation' and 'performed interpretation' (Williams 2011).

1.4. Contextualising Interpretation as Performance

The following three sub-sections present the contextual landscape for performed explaining with the fourth providing an explanation of the term itself. In these sections I illustrate how it can be understood as one component of a much broader sphere of live, people-based forms of engagement which themselves sit within the wider framework of interpretation (*Figure 1.2*). Importantly, this framework can be understood in relation to broader practices that have occurred since 1957, and specifically at ScM and wider SMG, from the latter part of the twentieth century (c. 1986) onwards.



(*Figure 1.2*) Diagram showing the location of performed explaining within wider framework of interpretation forms.

Interpretation in museums is usually conceptualised as the message(s) that the museum seeks to produce and share with its visitors, in short, everything it does to help the visitor understand and engage with collections and their themes (Williams 2011; Magelssen 2007; Cunningham 2004; Roberts 1997; Hooper-Greenhill 1994). As is highlighted in the following sections, the difficulties associated with identifying precise definitions for what constitutes the various forms of live interpretation, and its lack of suitability as a description of what Explainers in a science museum context do has led to my proposal of a new descriptive term.

1.4.1 Heritage interpretation - beginnings

In 1957 Freeman Tilden, an American with a diverse literary background in journalism, non-fiction and playwriting, assessed positively the potential value of live, people-based interpretation.[13] While working for the US National Park

[13] Arguably the origins of live-person interpretation can be traced much further back. Helen Rees-Leahy describes how at the British Museum, shortly after it opened in 1753, guides gave tours to the 'general publick' (2012:30) at such a fast pace that no one could understand much of what was being said. An example of early use of people-

Service Tilden published *Interpreting our Heritage* (1957), widely regarded as the first serious attempt to define and formalise interpretation activity, setting out six key principles, expressed as short statements, on which he suggested all interpretation should be based. Their relative importance and relevance largely endures in modern-day heritage interpretation and Tilden himself is generally thought of as the founder of the form.[14] The third of his principles is of particular interest here:

> Interpretation is an art, which combines many arts whether the materials presented are scientific, historical or architectural. Any art is in some degree teachable.
>
> (Tilden 1957:18)

He did not espouse the view that his six principles represented a fixed and exhaustive list, but rather that they should foster a willingness to stimulate and inspire the visitor to further enquiry or action – and in this aspect, his ideas can be seen to have cross-industry relevance to attempts to engage publics. Tilden's philosophy is inevitably strongly associated with US heritage and environmental interpretation and whilst he may have rightly identified the art in the form, it remains true that few regard the interpreter themselves as an artist. This research challenges this assumption and suggests that in addition to the educational function of the role, there also exists an artistic and performance-focused element. Also worthy of challenge is the continued use of the term

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based interpretation made ineffective as a result of the inherent institutional snobbery and resentment towards the general populace – the Museum trustees preferred to focus on providing access for the scholars.

[14] Heritage interpretation focuses on the communication of information about natural and historic sites, objects or phenomena. Typically it is delivered at museums, nature reserves and national parks and historic sites of interest. The remaining five principles are: 1. Any interpretation that does not somehow relate what is being displayed or described to something within the personality or experience of the visitor will be sterile. 2. Information, as such, is not Interpretation. Interpretation is revelation based upon information. But they are entirely different things. However all interpretation includes information. 4. The chief aim of Interpretation is not instruction, but provocation. 5. Interpretation should aim to present a whole rather than a part, and must address itself to the whole man rather than any phase. 6. Interpretation addressed to children (say up to the age of twelve) should not be a dilution of the presentation to adults, but should follow a fundamentally different approach. To be at its best it will require a separate program. (Tilden 1957: 18).

'interpretation' to describe the activities undertaken by Explainers in a science museum context.

Evident in the *OED* definitions of the word 'interpretation' is an underlying sense that explanations can be multi-layered or subject to individual perceptions or comprehensions. Certainly it has more nuanced connotations than the arguably more straightforward act of 'explaining'. This flexibility in the term is precisely one reason why it is so useful to the heritage industry – the past, as previously highlighted (see 1.2.2), is inevitably open to multiple readings and invites speculation. But for the kinds of activities presented by Explainers in the SMG - usually those that are concerned with demonstrable and verifiable scientific facts and concepts - there is a greater emphasis on coherently conveying accurate information, and subsequently less room for speculation and narrative. Contrary to Tilden's suggestion that the term 'interpretation' is applicable to all kinds of content, I propose that its application to the work of SMG Explainers is unhelpful. Indeed, when I first began working at NMeM Explainers were known as 'interpreters', but at some point during 2009-10 this title was changed in order to bring them into line with the educational element of role at the other sites. This change in descriptor offers an early indication of an increase in the centralised control of the role (see 5.5).

1.4.2. Live interpretation

The period from the mid-1980s to the early-1990s witnessed the arrival of several paradigm-shifting approaches concerning the ways in which museums regarded their visitors and a growth in a more meaningful role for educators. Emerging from the US John Falk and Lynn Dierking's detailed study *The Museum Experience* (1992), offers the first theorised attempt to understand why people visit museums. Importantly, they analysed how people's engagement with collections occur, concluding that three central contexts – personal, social and physical – are the main determiners affecting individual experience, and that people interpret what they encounter in different ways that are specific and unique to them. Alongside them, in the UK Eileen Hooper-Greenhill characterised the visitor as an active participant in the museum encounter suggesting that:

> Museums are changing from being static storehouses for artefacts into active learning environments for people (…) In addition to looking inward to their collections, museums are now looking outward towards their audiences.
>
> (Hooper-Greenhill 1994:1)

A little over twenty years later in the digital-age of fast-paced interactivity, it seems almost inconceivable to imagine a visit to many museums as a static, stilted experience yet, regarded as ground-breaking for their time, the focus in both of these publications was on developing more engaging ways in which museum educators could bring collections to life and provide meaningful and memorable experiences for visitors. For interpretive practices this meant a move beyond the usual text-based approach - text panels, labels and trail sheets for example - an approach that places the visitor as a passive consumer soaking up the museum's chosen messages. Instead it allowed for forms of *people*-based interpretation that looked to include the visitor in a more participatory way, delivering multiple outcomes dependent on the visitor's own experiences, interests and goals – and performance can be seen as central to these. The benefits of performance as an interpretive tool and the power of the visual and oral over simply reading a label are not difficult to imagine: reaching those for whom cultural displays might otherwise appear unfamiliar, intimidating or irrelevant; helping to animate objects and stories, quite literally bringing collections to life; and enabling people to make meaning from museum content that connects to their own lives and experiences (Jackson and Kidd 2007; Ford 1997). It is in this context that the expansion of ScM's use of people and performance-focussed strategies to engage visitors from the mid-1980s onwards, and explored in Chapter 4, is considered.

In the twenty years or so since this move to greater provision for more interactive experiences, the benefits of using live person delivery for heritage and museum interpretation have been well documented (Jackson and Kidd 2011; Magelssen 2007; Hughes 1998; Blais 1997; Risk 1994) yet practitioners continue to grapple with the question of precisely what is done in the name of 'live interpretation' and indeed, what the essence of 'live interpretation' actually is. For a starting point one must look to models and definitions that do not fully connect with live person interpretation in a *science museum* context – highlighting again the lack of attention paid to the form in this setting – and instead consider heritage-based models. Andrew Robertshaw, in his chapter entitled 'Live Interpretation' (Robertshaw in Hems and Blockley 2006: 41-42) notes this problem of clarity, drawing attention to the confusion caused by multiple and mixed uses of the term in diverse contexts such as museums, galleries and historic sites. His own proposed definition of the term is also broad, 'any presentation using people, usually costumed, whether in an historical environment or not' (Robertshaw 2006: 42) but he is insistent that the four essential core elements are 'historical content, educational intent, presentation skills and interaction with visitors'. His insistence that it must be historical in content reinforces other narrow readings of the form. Discussing the interaction between visitor and interpreter he highlights the critical need for 'flexibility of response' (Robertshaw 2006: 50) on the part of the interpreter, and its dependence upon the needs of the visitor. As Robertshaw observes, and as previously noted, the advantages of live person interpretation in this interaction are highly significant, but I suggest that these are not *dependent* on, or *limited* to, historic content. Despite there being less scope for layers of interpretation in a science context – science produces provable and conclusive results after all - the same skills are vital for any effective audience engagement in a variety of museum contexts – and in this sense the performed activities that come under the umbrella term 'live interpretation' can be used as a basis for defining those delivered by Explainers.

Robertshaw is not unusual in his perception of the limiting focus on the historical content of live interpretation, despite its broad methods. David Parry, founder in 1988 of the then highly innovative live interpretation programme at the Canadian Museum of Civilization, reveals a similarly historical orientation, describing it as 'clearly ephemeral, whether it be theatre proper, historical role-playing, or a demonstration (costumed or otherwise)' (Parry in Blais 1997: 24). Parry's summation invites the possibility of broad and widely encompassing interpretations, even before an analysis of what he means by 'theatre proper' might occur, and his description suggests that live interpretation could include almost any presentational activity. Significantly however, Parry notes the ephemeral nature of the phenomenon and in so doing touches upon one of the fundamental contemporary debates concerning performance (e.g. Fischer-Lichte et al 2014; Taylor 2003; Auslander 1999; Phelan 1993) at a time when it was first gaining ground. The International Museum Theatre Alliance (IMTAL), a global group formed in 1990 to promote and connect theatre and live performance as interpretative techniques in a range of cultural institutions, defines live interpretation thus:

> A broad term used to cover any live interaction between museum/site staff and visitors. This includes many living history-type activities, ranging from non-costumed demonstrations of historical craft to storytelling and costumed first- and third-person interpretation, but is also used to cover activities such as guided tours, education workshops, theatre performances and demonstrations.
>
> (International Museum Theatre Alliance: 2015)

Again, two striking features of the descriptions are the breadth of presentational activities that are encompassed by the term and the focus on historical content. UK applied theatre and heritage scholars Anthony Jackson and Jenny Kidd suggest that it is:

> Generally presented by professional actors/or interpreters in museums and at historic sites and may range from performances of short plays and monologues based on historical events or on-site exhibitions, to participatory events using "first person" interpretation or role-play.
>
> (Jackson and Kidd 2011: 4)

Despite employing the terms 'museum theatre' and 'live interpretation' on the front cover of their co-edited book *Performing Heritage*, Jackson and Kidd declare from the outset that their preference is for the word 'performance' as it is 'more all-embracing' (2011:1), but also since it recognises the expansion in interest in a focus on a performative interpretation of a wide variety of societal activities. Paul Johnson similarly notes the 'multiplicity' (Johnson 2011: 53) of heritage performance, but through his conceptualisation of a new framework for its analysis based on a series of binaries, he also challenges its makers to consider how the contemporary 'divergent range of performance practice [might] find space' (Johnson 2011: 66) in museum programmes.[15] In so doing, he opens up the possibility of heightened critical attention on *performance*, as opposed to learning, but the historic emphasis in his examples endures.

A scrutiny of exactly what is meant by 'live interpretation' then, offers significant room for debate and manoeuvre. What emerges with certainty however, is agreement that as a form, its boundaries are flexible, complex and not easily defined, but characteristically, its focus is on the historic.

There is no shortage of competition amongst live interpretive programmes in museums today. Indeed, contemporary audiences have almost immeasurable opportunities for choice in terms of how they spend their leisure hours – from the live, to the pre-recorded, to the virtual; experienced intimately, immersively, in a crowd, even globally. Performance Studies theorist Barbara Kirshenblatt-Gimblett articulates some of the varied purposes to which the modern museum, in its quest to attract visitors can lay claim, including: laboratory for the creation of new knowledge, performance space and memory place, as well as café, shop, exhibition space and cinema (Kirshenblatt-Gimblett 1998: 138). Her observations contribute to the theories of the 'new museology' that emerged largely out of the 1970s and '80s and revisioned the museum as an institution privileging the needs of the visitor over elitist custodianship of collections that sought almost to protect them from the wider communities that they were designed to serve. Instead, as previously noted, visitors were characterised as informal learners (Falk and Dierking 1997; Hooper-Greenhill 1994) and museums as 'establishment[s] for learning and enjoyment' (Hooper-Greenhill 1994: 2). Anna Farthing observes that they are also 'increasingly rich with stimuli for aesthetic experience' (Farthing 2011: 101) and thus it is unsurprising that performance, with its multi-sensorial properties, holds a significant place in museum interpretive practices. Nevertheless, notably in a predominantly historic context, many museums are resistant to the notion of their spaces as 'theatrical', and their visitors as 'audiences' (Jackson and Rees-Leahy 2005).

[15] Johnson's binaries comprise: history/fiction; external/internal; risk/safety (2011: 55).

Stemming largely from concerns regarding the 'inherent fictionalizing medium of interpretation' (Jackson and Rees-Leahy 2005: 305), the suggestion that the seriousness and authenticity of the museum and its collections might be compromised by association with something that has more to do with entertainment and commercial gain, appears to be the root cause.[16] In the context of *science museum* interpretation however, where the emphasis is frequently more concerned with the explanation of phenomena rather than past events and practices, there is arguably less risk that performance-based practices can be misjudged, and greater opportunities for the kinds of active participation sought by the SMG in pursuit of its life-enhancing qualities. In this sense, performed explaining may be seen less as something that is done *for* the visitor, and more as an activity that takes place *with* them.

Kirshenblatt-Gimblett's concerns have echoes of this idea and she questions what role the 'museum product' will continue to have in the future as 'audiences appear increasingly less interested in the quiet contemplation of objects in a cathedral of culture. They want to have an "experience"' (Kirshenblatt-Gimblett 1998: 139). Susan Bennett expands on this theme some fifteen years later, perhaps coming a little late to the debate, arguing that the drive to secure visitor numbers and for commercial success supersedes the 'traditional' view of the museum as 'shrine' (Bennett 2013: 20). She goes on to explore the notion that in the context of 'visitor engagement' and a 'revisioned museum', the visitor becomes 'not simply a viewer of the display but a participant whose job it is to experience the environment on offer' (Bennett 2013: 21). In an echoing of Kirshenblatt-Gimblett's musings on the possible futures of the 'museum product', this emphasis on the visitor as *participant,* not simply informal learner, offers one way forward for museums as they look to contemporary experiential and participatory forms of performance for inspiration in the creation of alternative forms of interpretation and active audience engagement. Certainly Bennett's view that 'theatres and museums have increasingly become both symbolic and actual neighbours, sharing the task of providing entertaining and educational experiences that draw people to a district, a city, a region, and even

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[16] This observation by Jackson and Rees-Leahy also highlights the distinctions that I am drawing between 'interpretation' and 'explaining'.

a nation' (Bennett 2013: 3) offers another persuasive voice to the notion of live person interpretation as a key factor in the future progression and development of the 'museum product', although it is noted that Bennett's interest is largely in museums' performative strategies of exhibition and display rather than in ways in which museums themselves utilise live persons for interpretation.

1.4.3. Performed interpretation

In her doctoral thesis *Living Histories: Performing Work and Working Lives in the Industrial Museum* (2011), Polly Williams shifts an understanding of the presentational interpretative practices in the context of the industrial heritage museum/site towards a consideration of them as *performance practice*. In common with other definitions of live interpretation Williams notes its all-encompassing quality, adding her own definition of: 'any live interactions between the museum and its visitors and may include first and third person interpretation, living history activities, tours, theatre performances, workshops and demonstrations' (Williams 2011: 16). Coining a new term 'performed interpretation' she suggests utilising this description in order to draw attention to the performative nature of the activities, some of which, she argues, are not usually thought of in this way (notably guided tours and demonstrations). Importantly for this research, Williams identifies the transformative qualities inherent in performed interpretation, including: altering space and time, and for the visitor – moving between the roles of spectator, learner, pilgrim, participant and audience (Williams 2011: 270).

Williams identifies the numerous titles given to the people who deliver performed interpretation at the sites forming her case studies including 'living history presenters' (National Coal Mining Museum), 'costumed interpreters' (Quarry Bank Mill and Beamish), 'presenters' (Manchester Museum of Science and Industry) but finds that despite the variety of title, there are significant similarities in the ways in which they use performance as an interpretive mode in the different sites.[17] As with live interpretation and the many activities that

[17] Williams' research was conducted between 2007-2010, before Manchester Museum of Science and Industry became part of the SMG in January 2012 and the resultant significant changes were made to the use of people-based interpretation. Williams was particularly

are done in its name, the varied titles of the roles that deliver it point to a lack of coherence in industry attention and attitudes – a further justification for attempting to more carefully define and distinguish the role and work of the SMG Explainer. Whatever descriptor is used, connecting all of these roles, and also having some parity with the actor's purpose, is the function to communicate, stimulate, empower, provoke – and ultimately, to effect some element of transformation. The work of the interpreter/Explainer is centred on the provocation of audiences into a fresh interaction with objects and concepts that will surprise them and challenge their assumptions and responses.

1.4.4. Performed explaining

Using Williams' notion of performed interpretation alongside the aforementioned definitions of live interpretation as a springboard for defining the presentational work of the SMG Explainer and its antecedents, I suggest that those activities delivered as part of the SMG public programme can be more precisely defined by the new term, performed explaining. This description incorporates the explicit, and sometimes implicit, use of numerous theatrical forms and styles blended with the communication and explanation of scientific principles, as evidenced in the activities delivered by Explainers in the Learning teams of the SMG. Explainers do not engage in either first or third person interpretation, although they do tell stories, sometimes in character. They also give informative gallery talks, perform demonstrations, present interactive shows and give tours.

The lack of breadth of inclusion with regard to definition of content i.e. the typical focus on the historic, paves the way for my proposition that the live presentation work of the SMG Explainer be defined as something else. With its roots in the rich traditions of live interpretation, and using many of the same techniques of performance and presentation, performed explaining is a term that I suggest offers a more accurate description of the work of the SMG Explainer.

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interested in first and third-person interpretation, representation and authenticity in a living history context.

Although, as described, scholarly interest in live person interpretation has leant towards a concentration on the uses of performance in historic sites and heritage museum contexts, there has been some consideration of its place in a science museum context (Boyle 2010; Quin 1997; Rennie and McClafferty 1996; Hein 1990). These examples however, tend towards brief articles or single chapters that focus more on the associated pedagogical philosophies rather than any performance-based reading of the role. Alison Boyle's chapter *Communicating in Museums and Science Centres* (in Brake and Weitkamp 2010) for example, includes a short paragraph entitled *Live Interpretation* in which she highlights the importance of it as a 'major part' (Boyle 2010: 158) of science museum interpretation. Moving on to offer a generalised list of activities such as gallery tours, drama, storytelling, live experiments and demonstrations of working objects she offers no further discussion of the impact, or indeed of any detail of the forms and their appropriateness for science interpretation, and in this sense her list serves only to bolster the unhelpful broad definition previously described.

In a 1997 conference paper exploring how people-based interpretation might be used in the future to engage the public in science museums, Melanie Quin proposes the use of the term 'player-scientists' (Quin 1997: 82), a clear sign of recognition of the performance element of the role, although a title not taken up within the industry, possibly since the term 'scientists' implies a particular level of expertise and specialism. Robert Finton of the Maryland Science Centre adopted the term 'actor/demonstrator' (Hughes 1998:107) as a means of trying to find the balance between the form and content of science museum theatre, but again, this is not widely used. A term that has sometimes been adopted for use in the interpretation of science is 'Explainer', and is of course, the term employed to describe the role in all of the museums within the SMG.[18]

The proposal of the term performed explaining is then, an attempt towards a redefinition of the performance-based work presented by contemporary SMG Explainers, distinguishing it from the somewhat confusing blend of performance

[18] The origins of this term and its association with the hands-on interactive approach often used in science discovery centres are fully explored in Chapter 4 of this thesis.

modes that are commonly used in the museum and heritage industry and that locate a wide variety of presenter-roles and their outcomes together in one muddled form.[19]

1.5 Overarching Theoretical Frameworks for the Research

In this section I present the general rationale for adopting a performance-focussed approach to an understanding of the SMG Explainer role, its antecedents, and the nineteenth-century lecture-demonstration practices of the RI, before highlighting the performance theories that have particularly influenced this research investigation.

US sociologist Erving Goffman's (1959) application of the conventions of dramatic performance to an analysis of everyday social situations, and its subsequent appropriation by Performance Studies scholars (e.g. Schechner 2006; McKenzie 2001; Kirshenblatt-Gimblett 1998; Carlson 1996; Schechner 1977), has led to a pervasive notion that performance can be found in a seemingly limitless number of quotidian situations and social rituals, and that at one level we can all be described as 'actors'. Marvin Carlson posits that 'the recognition that our lives are structured according to repeated and socially sanctioned modes of behaviour raises the possibility that all human activity could potentially be considered as "performance", or at least activity carried out with a consciousness of itself' (Carlson 1996: 4). Robert Leach suggests that 'any piece of behaviour/doing/action which is in some way marked off, or framed, is a performance' (Leach 2008: 2), similarly drawing attention to the idea that it is the consciously-acknowledged framing of an act that constitutes performance. Acknowledged in these reflections is that differences between 'doing' and 'performing' are characterised by the attitude of consciousness or

[19] It is possible to also consider performed explaining within the context of popular forms of science communication such as science busking (see British Science Association Science Communication Conference 2014 Final Report p.57), *Punk Science* (Science Museum: 2015a) and *Bright Club* (National Co-ordinating Centre for Public Engagement: 2014) but these are beyond the scope of this thesis.

self-awareness. In response to the question 'what is performance?' Richard Schechner (2006) further develops this idea:

> "Being" is existence itself. "Doing" is the activity of all that exists (…) "Showing doing" is performing: pointing to, underlining, and displaying doing.
>
> (Schechner 2006: 28)

Re-presenting actions that constitute 'doing' in a conscious manner are then, for Schechner, acts of performance, that should also be seen to be in a continuous state of flux since the specific conditions of performance will never be precisely the same even if the 'doing' itself is repeated. These predominantly Performance Studies-centred definitions of what constitutes performance have informed my approach towards a performance-focussed reading of the Explainer role and the RI lecture-demonstration practices of the nineteenth century. One potential consequence of these multi-layered definitions is that what can be attributed to performance becomes complicated and difficult to specify with precision, as previously illustrated in the examples of live interpretation (1.4.2). In this thesis I take the notion of consciously presented actions, framed within the context of a given space and in the presence of onlookers to constitute 'performance' as it applies to twenty-first-century performed explaining, twentieth-century lecture and nineteenth-century lecture-demonstration practices.

Rather than applying one theoretical approach throughout the thesis I engage with and draw upon a range of literature that is especially connected to the ways in which certain performance traditions can be seen as transgenerational. The following sub-sections highlight three concepts that are of particular importance to this research: embodied knowledge transmission, intertheatricality and vertical transmission. Using combinations of these at different moments throughout the thesis, I articulate a performance framework that enables connections to be established between the contemporary Explainer role and its various antecedents.

1.5.1 Embodied knowledge transmission: Schechner, Carlson and Taylor

Richard Schechner's (2006) definition of 'restored behaviour' provides a good starting point for consideration of the mechanisms by which embodied knowledge transmission is achieved:

> restored behaviour: physical, verbal, or virtual actions that are not-for-the-first time; that are prepared or rehearsed. A person may not be aware that she is performing a strip of restored behaviour. Also referred to as twice-restored behaviour.
>
> (Schechner 2006: 29)

Restored behaviour hinges on the perception that all human behaviours are multi-authored composites of actions that have already been practised, that the 'units of behaviour that comprise "me" were not invented by "me"' (Schechner 2006: 35). Positioning Schechner's restored behaviour as 'fundamentally repetitive or reiterative (…) necessarily bring[ing] back the past to unsettle the present', Bush-Bailey and Bratton (2011:100) show how it offers one approach to dealing with the impact of historical performance events in the present day. Within the context of this thesis such a notion can be understood as: the actions of performed explaining in the twenty-first century are seen as iterations of previous actions that have already occurred through lecture-demonstration practices in the nineteenth century. But how to capture and explore those past practices? Research into performance history, in this instance the performance of those lecture-demonstrations, presents a specific problem, one that Joseph Roach refers to as 'the issue of absence [in] performances of the distant past' (Roach 1996: 11) due to its transient and ephemeral form. Roach observes that one significant method used by performance researchers today is to 'juxtapose living memory as restored behaviour' against the available tangible archival material, an approach that is useful to this research.[20] By suggesting that living memory can be a form of restored behaviour, Roach implies the possibility that behaviours and actions from a previous time can be unknowingly trained for and practiced, and leave an imprint on the corporeal and cerebral faculties of those living who encounter traces of those past behaviours. In this sense it is as though the legacy of a

[20] Roach acknowledges his debt to Christopher Balme for this idea (Roach 1996: 11).

particular skill or style of performance may be recreated, or restored, in present actions some time after the original has ceased. Important to note here is Schechner's assertion that no two performances/restored behaviours are exactly the same – the contexts and conditions of reception are unique - but that thinking about performance in the sense of restored behaviour means it is never uniquely for the first time: 'Performance means: never for the first time. It means: for the second to the *n*th time. Performance is "twice-behaved behaviour"' (Schechner 1985: 36).

Diana Taylor (2003) expands on this idea through her notion of 'the archive and the repertoire'. As Gale and Featherstone observe, 'for Taylor, the historical prioritisation of the text-based archive has meant the repertoire [...] has been given less significance than it might have been' (Gale and Featherstone 2011: 20). Taylor is particularly interested in the ways in which knowledge is produced and transmitted through embodied means. In making the distinction between the hard, tangible contents of the archive, 'supposedly enduring materials (i.e. texts, documents, buildings, bones)' and what she refers to as 'the so-called ephemeral *repertoire* of embodied practice/knowledge (i.e. spoken language, dance, sports, ritual)' (Taylor 2003: 19 italics in original), she highlights how the former separates the knowledge from the knower. Taylor argues that unlike the objects in the archive, which although open to interpretation by whomsoever may engage with them essentially remain constant, the actions of the repertoire are flexible and unfixed. She states that:

> The repertoire requires presence: people participate in the production and reproduction of knowledge by "being there", being a part of the transmission.
>
> (Taylor 2003: 20)

This transmission may incorporate changes and additions as the participants appropriate the embodied knowledge. As with Schechner's restored behaviour, Taylor recognises the possibility of a state of 'againness' (Taylor 2003: 21), acts of behaviour that are played out in subtly different forms with each new iteration, as if the memory is being replayed, 'They reconstitute themselves, transmitting communal memories, histories, and values from one group/generation to the next'

(Taylor 2003: 20). Importantly, Taylor observes that the 'repertoire (…) allows scholars to trace traditions and influences' (Taylor 2003: 20) making it a particularly useful concept for this research.

Citing French historian Pierre Nora's notion of 'true memory', Roach also highlights the concept of the transmission of embodied memories across time:

> '[T]rue memory' [can be found in] gestures and habits, in skills passed down by unspoken traditions, in the body's inherent self-knowledge, in unstudied reflexes and ingrained memories.
>
> (Roach 1996: 26)

In this way, the historical physical practices of nineteenth-century science lecture-demonstrations may be seen, as I argue, as reconstituted actions in the repertoire of contemporary performed explaining. This idea intersects with what Marvin Carlson in *The Haunted Stage* refers to as 'recycling' (Carlson 2003), a concept he applies to theatrical text, body, production and space. Building on the notion that 'all texts are in fact haunted by other texts and can be best understood as weavings together of preexisiting textual material – indeed, that all reception is based upon this intertextual dynamic' (Carlson 2003:17), he argues that all the constituent parts of all theatrical production have been recycled or reused, an idea that complements Schechner's notion of restored behaviour.

If it is accepted that nineteenth-century lecture-demonstrations and the work of the Explainer antecedents at ScM is *performance*, then this framework of embodied knowledge transmission from Performance Studies might help explain the embodied history of contemporary forms of SMG performed explaining, suggesting it is as a 'reusing' of nineteenth-century lecture-demonstration performance, a central tenet of my argument. Roach's observation regarding commonly-held assumptions about the essence of performance foregrounds its fleeting, transient nature:

> [P]erformance offers a substitute for something else that preexists it. Performance, in other words, stands in for an elusive entity that it is not but that it must vainly aspire both to embody and replace.
>
> (Roach 1996: 3)

One of the fundamental and enduring challenges encountered in any investigation of performance is its ephemerality. Peggy Phelan's statements on the notion of 'disappearance' (1993) are frequently cited in debates concerning the transience of performance. Phelan's stance as articulated in *Unmarked: the politics of performance*, that 'Performance's only life is in the present' (1993:146) is, for her, unequivocal.[21] This position forms the backbone to other scholarly assertions (e.g. Reason: 2006) that since performance begins and ends in the same moment, what remains must be something else:

> Performance cannot be saved, recorded, documented, or otherwise participate in the circulation of representations *of* representations: once it does so, it becomes something other than performance. To the degree that performance attempts to enter the economy of reproduction, it betrays and lessens the promise of its own ontology.
>
> (Phelan 1993: 146)

Phelan's position here seems to overlook the possibility of performance being stored within the body to be reused at some later point. Although this could not constitute a *re-performance* of the original – in this sense I agree with Phelan's observation that it 'becomes something else' – there does exist the possibility that through embodied practices performance can be sustained and repeated, and in ways that are not necessarily lessened or betrayed. In this thesis I suggest that the continuous embodied revising and *re*-presentation of the RI's nineteenth-century performed lecture-demonstration practices via the performances of each new generation of scientist-practitioners, can be seen as having facilitated a sort of 'living archive', what Phelan might call 'an encouragement of memory to become present' (Phelan 1993: 146). The extant documentation of these nineteenth-century performances takes a variety of forms including written eyewitness accounts, the letters and lecture-notes of the scientists themselves, and lithographs – the mediatising paraphernalia of the time – such documentation contributing to

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[21] Philip Auslander's well-known challenge to Phelan's theory is encapsulated in his book *Liveness* (1999). He suggests that the concept of the 'live' can only exist in the first place due to the presence of recording media – that it is in fact, an artifact of this media. Auslander's view of cultural economy is that 'at any given historical moment, there are dominant forms that enjoy much greater cultural presence, prestige, and power than other forms' (1999:162), concluding with the assertion that as mediatized forms develop and progress, the 'symbolic capital' of the live event is likely to be further diminished. While this particular strand of the debates concerning notions of liveness in performance is not of particular significance to this research, awareness of it as a counter argument is useful.

and enhancing re-presentation and re-imagining. In the instance of RI performed lecture-demonstrations there is also a further layer of complexity since the performance here is of the production of scientific knowledge – the lecture-demonstrations were and are tangible and physical, if fleeting, moments of its presentation. Once the moment of performance has passed, the remaining capital - the knowledge itself - exists in the memories and experience of the spectator and the scientist-practitioner. Later still it will also be present in any associated written, visual or aural documentation. In this respect there are echoes of Diana Taylor's positioning of performance as something 'which persists, transmitted through a nonarchival system of transfer that [she] came to call the *repertoire*' (Taylor 2003: xvii). Taylor, as previously stated, identifies the repertoire as that which 'enacts embodied memory: performances, gestures, orality, movement, dance, singing – in short, all those acts usually thought of as ephemeral, nonreproducible knowledge' (2003:20). The performed lecture-demonstration practices of the nineteenth century have not before been thought of in this way, but considering them as part of a repertoire appropriately recognises how the embodied traditions of two hundred years ago have, in Taylor's words, been 'transmitted "live" in the here and now to a live audience. Forms handed down from the past are experienced as present' (Taylor 2003: 24). The 'here and now' practices at the RI, remain little altered since their earliest days, but as I suggest, traces of them also reside in the 'here and now' practices of the SMG Explainer.

Of course, the precise, fleeting moment of the *performance* of the lecture-demonstration vanishes as it is created, but aspects of it can be re-presented in subsequent iterations. Where Phelan talks about the potential that live performance offers for 'revaluing [the] emptiness' (1993: 148) left behind she also notes that its 'tracelessness' is negated by writing about it, since something tangible remains. Rather than negating, these traces can be seen as having a critical positive role to play – the eye-witness accounts, lecture notes and letters of the nineteenth century help to inform future iterations and ensure the longevity of the form. In this thesis a combination of physical documentation and embodied memory – Taylor's 'archive and repertoire'– is used to trace the connections between past and present practices.

1.5.2. Intertheatricality: Bratton, Bloom, Bosman and West

Marvin Carlson's previously cited concept of 'recycling' chimes with another important theoretical framework for this research, Jacky Bratton's concept of 'intertheatricality' (Bratton 2003: 37-8). In *New Readings in Theatre History* (2003) Bratton articulates a new theorisation of the transactions in theatre in which she envisages a 'mesh of connections between all kinds of theatre texts, and between texts and their users' (2003: 37). Focussing particularly on theatrical performance in London in the 1830s, Bratton uses the material remains of playbills to investigate the ways in which audiences were able to read and interpret performances by building on their previously acquired experiences of both the specific contexts of the performance itself, and also of all the associated contexts – reputation of performers, other roles played or other interpretations of the same role, for instance. Seeking to expand Schechner's conceptualisation of performance as taking place from the 'first time the spectator enters the field of performance (…) to the time the last spectator leaves' (Schechner 1994: 72), she suggests instead the inclusion of an awareness 'about playing that spans a lifetime or more, and that is activated for all participants during the performance event' (Bratton 2003: 37). Bratton's concept of intertheatricality capitalises on building the 'knowingness' that comes from the experience and memory of particular performances, and their contexts, and suggests that many forms of performance can be held by spectator and performer as part of the shared language of a system that will ultimately shape and enhance individual interpretations of future performances yet to be made and seen. Her suggestion that the specific performance event is a 'point of crystallisation in a continually moving, dissolving and re-forming pattern' (2003: 38) where the various elements are not necessarily overtly noticed or remarked upon, but nevertheless influence and impact upon the participants, is significant here. Building on this idea and combining it with theories of embodied knowledge and vertical transmission (see 1.5.3), I suggest in this thesis how the spectatorship of performances of nineteenth-century RI lecture-demonstration can be seen as having influenced the performance of twentieth century lecture practices at ScM, and ultimately the SMG performed explaining practices of today. Where Bratton uses the materiality of the playbill as her evidence, I use the more elusive and non-material embodied knowledge and actions of practitioners.

William N. West's essay *Intertheatricality* (2013) exploring reverberation and repetition in Elizabethan theatre also uses Bratton's concept as a starting point. As with aspects of my own investigation, West is particularly interested in the reiteration of action and gesture in performance and how this can result in experiences that seem familiar for audiences and performers. He suggests that 'to look in an "intertheatrical" way – is to seek shared memories of actions that can be called up to thicken present performances' (West 2013: 155). This description of past actions 'thickening' those in the present has resonances with my location of the roots of twentieth and twenty-first century ScM lecturer and Explainer performance actions in nineteenth-century RI lecture-demonstration practices.[22] Of even greater interest here is West's overarching definition of intertheatricality:

> Rather than seeing different patterns and forms of performance as variations on a fixed type (...) it understands them as belonging to a horizontally organised repertoire, never completed and slowly changing, of lines, gestures, characters, situations, genres, and other smaller elements that cumulatively allow for new performances and new concatenations of actions. Let us call this way of looking at playing its 'intertheatricality'.
> (West 2013: 156)

Here, in a description that echoes Bratton's 'continually moving, dissolving and re-forming pattern', West envisages new performance as something that repeatedly evolves out of other existing performances, but that moves 'horizontally', within one time frame (in his example, the Elizabethan age).[23] Bratton's conceptualisation similarly contains a potentially limiting factor through her suggestion of interdependency amongst the various entertainments and dramas 'that are performed within a single theatrical tradition' (2003: 38). I posit here that physical traces of RI nineteenth-century lecture-demonstration practices have lingered and endured and, over an extended period of time, can be said to have become intertheatrically enmeshed with elements of *other* forms of performance, re-

[22] Although West does not cite Clifford Geertz's (1973) use of 'thick description', it is implied here in his definition of 'intertheatrical'. Particularly associated with the field of anthropology, Geertz argues for a cultural analysis of human behaviour that probes 'beyond the obvious and superficial' (1973: 29) and includes all the associated contexts of behavioural acts. It is useful for the ways in which it can bring about a deeper understanding of events and behaviours that have not been directly experienced, leading to greater appreciation of their impacts and consequences.

[23] These descriptions also contain echoes of Carlson's notion of 'recycling' and Schechner's 'restored behaviour'.

emerging in the performance practices of the twenty-first-century SMG Explainer. The context I narrate here suggests that Bratton's notion of intertheatricality can be expanded beyond the single tradition of theatre.

Gina Bloom, Anton Bosman and William N. West (2013) provide a useful source in this respect. In their co-authored essay *Ophelia's Intertheatricality, or, How Performance is History* in which they explore the limitations of thinking about performance as transitory, they present a core element of their argument as:

> Performance (…) is not always already disappearing, but emerges through, is indeed constituted by, dissemination and reverberation. It does not take place in an instant, as an event, but recalls, lingers, and persists, expanding and even exploding the confines of synchronic temporality, appearing as the on-going opening of history rather than the closing of the gates of its departure.
>
> (Bloom et al 2013: 167-68)

Their suggestion here of reverberation, expansion and the possibility of multiple simultaneous occurrences is important to this research in relation to the lecture-demonstration practices of the nineteenth century. It offers a model for performance that expands and develops as an on-going process over time, its influence drawing on its past to shape future iterations that may be multiplied and repeated. Thus, traces of the performance/lecture-demonstration practices of the nineteenth-century RI scientists can be seen as reverberating in the here and now performances of the SMG Explainers. Jonathan Gil Harris has described intertheatricality as serving as 'a reminder that the matter of the stage is not simply physicality existing in the here and now of the performance. It is also dynamic material (…) that is worked upon and transformed by theatrical praxis' (Harris 2008: 69). A sense here of material shifting and adapting to meet the demands of new audiences and makers, but never entirely losing its original essence.

Using the example of Shakespeare's *Hamlet*, and specifically the character of Ophelia, Bloom et al show how an actor's interpretation and performance can be shaped by myriad iterations and become a 'node in a net of performance practices that precede, coincide with, and even follow it' (Bloom et al 2013: 176). Their use of the word 'net' has evocations of Bratton's use of the term 'mesh' and a picture emerges of intrinsically linked strands of ideas seemingly without beginnings and endings that operate as an interconnected system of support, influence and regeneration. Significantly, they suggest that it is a 'set of overlapping familiarities', not necessarily consciously recalled, of both actors and spectators that enable feelings of recognition and understanding to occur and that are not tied to any one moment in time. The gestures of Ophelia, for example, can never be wholly new and original – she 'feels familiar' to an audience even if they have never before encountered the text or its performance.[24] While they acknowledge the slightly imprecise quality of the term 'feel' it is this characteristic that is useful to this research, and through the careful martialling of the various available sources I construct a path that illustrates how this atmosphere of familiarity of past traditions can be seen as manifesting itself in the present. Modern-day audiences of Explainer-led science shows at SMG museums cannot know how it *felt* to attend a nineteenth-century lecture-demonstration at, for example, the RI, but the qualities and ambiance of the contemporary performance somehow *feel familiar*. It is one of the contentions of this thesis that that familiarity is present because of the processes of intertheatricality. It occurs because of the repetitions and variations extant in the lecture-demonstration/performed explaining practices over the last two hundred and fifty years – the *roots*, and also anticipates future revisions – the *routes* towards contemporary practices and the development of future possible iterations. In the words of Bloom et al:

> Each new performance selects the chain of works that it completes or constructs out of the debris of past performances; each performance gesture makes a history for itself as much as it is made from an existing history, and each contributes to the repertoire of future performances.
> (Bloom et al 2013: 181)

Intertheatrical processes and readings by themselves are however, not enough to facilitate the transmission of practices across the time frame that I suggest. Combined with embodied knowledge theories (1.5.1), I consider the concept of

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[24] For example, they suggest that when the actor playing Ophelia appears onstage 'distracted', she can never be 'an/the original act'. The performance history of the character operates as a sort of melting pot of gestures, expressions, postures and actions that refer back to past iterations and societal conventions whilst also opening up the possibilities of future performances.

vertical transmission as the final theoretical framework that has influenced this research.

1.5.3. Vertical transmission

Intertheatrical notions of performance practices that occupy a place that is simultaneously created from the past whilst making their own contribution to new practices – which will in turn go on to influence future work - have resonances with the concept of vertical transmission, as it is applied to performer training and performance transmission practices. The issue of transmission in these contexts has been variously discussed (Pitches 2015 and 2011b; Evans 2009; Watson 2001; Schechner 1985) with one important issue of commonality being aspects of physical skill and embodied knowledge.

In his book *Performer Training: Developments Across Cultures* Ian Watson elaborates on his adoption of the term 'vertical transmission' (Watson 2001: 3), describing the practice of performance skill and embodied knowledge being handed down from one generation to the next as being part of a broader tradition that he classifies as 'direct training' (Watson 2001: 2). In particular, Watson evidences certain traditional East Asian forms such as Japanese Noh theatre, the Indian dance-drama Kathakali, and Balinese dance where the focus is on specific skills being taught by masters to apprentices, the aim being to transmit a precise codified language relating to an established repertoire, with little deviation from the master's performance.[25] Watson offers perhaps the most fundamental example of vertical transmission in Japanese Kabuki theatre, where on retirement a great actor passes on to one specially chosen pupil not only his skills and embodied knowledge, but also his actual name (Watson 2001: 3). Schechner (1985) also turns to early East Asian forms in his discussion of the embodied ways in which performance traditions are embedded and then passed on in different cultures. He goes significantly further to suggest that such practices are likely to have been established in 'what might have been the world's earliest theater, the events occurring within the paleolithic caves of southwest Europe' (Schechner 1985: 22)

[25] Watson also uses 'indirect training' (2002: 1) to describe approaches more commonly used in Western practices where performers learn a range of skills that can be broadly applied to each new production as required. 'Direct training' is much more closely associated with sustaining traditions and traditional practices.

some twenty-five thousand years ago. Highlighting the dances performed by the 'dancer-shamans', he posits that their form was known to spectators and performers alike and 'kept from one instance to another', suggesting that:

> [T]he shape was taught by one group of dancers to another. Most probably this teaching was not formal, but through imitation.
>
> (Schechner 1985: 22)

It is not difficult to imagine other physical practices where the transmission of embodied knowledge, or know-how, is, like the dance of the dancer-shamans and the dance of today, dependent upon one individual emulating the activities of another. In a wide variety of sports training, for example, coaches are frequently highly skilled and practised in the activity themselves, thus able to best demonstrate accurate technique for the benefit of students. Schechner notes a similar pattern in theatre training: 'Theater people know about training; it is expected that teachers of theater be able also to practice it' (Schechner 1985: 25). In these models the passing on of skills is deliberately structured around the notion of 'imitation', critical to theories of vertical transmission, and there is usually an explicit sense of a 'master-disciple' (Schechner 1985: 23) relationship.

In the 'V' Section of *A Lexicon of Training Terms*, Brayshaw et al define the term:

> Verticality is the embodied transmission of training knowledge and skill from one generation to the next, usually in a specific training context which allows for a deep and long-lived relationship between the trainer and trainee. Because of its association with generational transmission, verticality is often referred to as occurring within a training 'family' – from surrogate father to son but much less often from surrogate mother to daughter.
>
> (Brayshaw et al 2012: 397)

As with Watson and Schechner's interpretations verticality in this definition is primarily concerned with the notion of repetition and replication, rather than a practice that reinterprets and rediscovers (as with Taylor's repertoire). But noteworthy here, is the suggestion that the vertical relationship privileges the passing on of embodied skills from 'surrogate father to son'. This is in contrast to the etymological root of vertical transmission from medical science, which denotes a mother-child descent:

> **Vertical transmission**: Passage of a disease-causing agent (pathogen) from mother to baby during the period immediately before and after birth.
>
> (WebMD: 2015)

The western adoption and re-positioning of the term in a performer-training context to describe a male-oriented hierarchical relationship reveals much about the patriarchal domination of the field and indeed, it is only in the latter part of the twentieth century that women have been seen to play a credible role in western performer training practices.[26] While issues of gender are not a key focus of this thesis such habits form part of an enduring trend that can be seen in the Explainer lineage that I trace which also only ends in the most recent years. In the parallel domain of the RI, practitioners during the nineteenth century were exclusively male. Indeed with only a minority of exceptions, this prevalence has persisted, and similarly it was not until the late 1980s-early 1990s that women began to be regularly included in ScM educational practices.[27]

Vertical transmission is useful in this research context for the ways in which it helps explain the construction of what has been termed a 'physical storyline' (Pitches 2011b: 141) depicting, in this case, how nineteenth-century lecture demonstration practices have been transmitted through the twentieth, and on to the twenty-first centuries.

Brought together, and here applied in the context of science lecture-demonstration practices for the first time, these three performance-centred concepts – embodied

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[26] Examples of notable female performer trainers include: Stella Adler (1901-92); Joan Littlewood (1914-2002); Anna Halprin (1920-); Anne Bogart (1951-).

[27] Of the fifty-three figures highlighted on its website for having made a significant contribution to the work of the RI, just three are women. This list includes Davy, Faraday and Tyndall. The first Christmas Lecture in its one hundred and ninety year history to be delivered by a woman, Susan Greenfield, did not occur until 1994 and to date, just six women have undertaken this flagship RI event. The first woman ever to give a Discourse at the RI was Art Historian Joan Evans on June 8 1923 (Royal Institution: 2014). As far as I could establish from the available evidence there were never any female Guide Lecturers in ScM Lecture/Education Service.

knowledge practices, intertheatricality and vertical transmission – form the basis of the theoretical framework for the thesis, harnessed at different moments throughout. In essence, they support my analysis of the relationships between individuals and their roles at both the RI and ScM, enabling my articulation of a new theory of evolution and lineage for the SMG Explainer role.

1.6. Chapter Summaries

Chapter Two: Nineteenth-century perspectives

This chapter introduces the lecture-demonstration practices of three significant nineteenth-century scientists at the RI – Humphry Davy, Michael Faraday and John Tyndall - seeking to establish the ways in which their work can be regarded as providing the roots of contemporary performed explaining. The chapter argues for an understanding of the historic practices in parallel with performer training notions of vertical transmission, interconnecting with the concepts of intertheatricality and embodied knowledge transmission practices to suggest their on-going reiteration in subsequent generations. This chapter also suggests how these practices can be understood as theatrical event and explores some of the associated training and rehearsal processes in the context of theatrical performance parallels.

Chapter Three: Explaining the Collections: the development of ScM Lecture Service (1909 – c.1980)

Using multiple sources from ScM's own archives this chapter uniquely presents a critical exploration of the Guide Lecturer role, first appearing in 1924 and the earliest tangible provider of performed explaining at ScM. The chapter illustrates how the period from then until c.1980 encompassed significant developments in the ways in which ScM attempted to engage younger audiences and proposes that the Guide Lecturer role is regarded as the prototype for the contemporary SMG Explainer role, particularly for the ways in which it represents a model of visitor engagement that operates inside the galleries. The chapter shows how this activity subsequently expanded to include more consciously performance-based demonstration modes in the form of lecture-demonstrations. Significantly, this chapter investigates the period September-December 1954 when Guide Lecturers were sent to observe the lecture-demonstration practices at the RI, thus establishing a critical embodied and intertheatrical link in the Explainer lineage that ties popular contemporary explaining practices to a rich tradition of elite lecture-demonstration conventions.

Chapter Four: From Demonstration to Participation: the rise of interactivity at ScM (1960-2000)

Once again using evidence from ScM's archive, this chapter outlines the context of change in public attitudes to science communication from the 1960s–1990s and in particular, examines how these were reflected in performed explaining at ScM. Exploring the growth of the Interactive Science and Technology Centre the chapter also examines influences from the US, with a focus on the birth and development of the Launch Pad gallery and subsequent emergence of the Explainer role. The chapter extends the lineage of the contemporary Explainer role through an exploration of three similar ScM roles apparent in this period – the Discovery Room Helper, the Test Bed Assistant and the Launch Pad Assistant. Notions of vertical and embodied knowledge transmission particularly inform this exploration.

Chapter Five: Perspectives on the Contemporary SMG Explainer (2000-2016)

This chapter represents a marked shift in approach and moves from historical account to an exploration of contemporary practices. Using a range of data obtained primarily through observation and interview, the chapter presents views of the Explainer role and performed explaining as it currently exists in the three exemplar SMG sites. The chapter is necessarily highly contextual and focuses on the ways in which economic constraints imposed as a result of the UK government's deficit reduction measures in the period 2010-15 have impacted on SMG practices and the work of the Explainer. In particular this is evidenced in a discussion of the increased focus on STEM at NMeM and MSI. Using the framework of vertical transmission to inform an analysis of current Explainer training methods, the expansion of the role towards a 'branded' entity across the SMG is explored. Also significant to the chapter is the presentation of the contemporary role as a complex hybridisation of performance registers, leading to the suggestion that its status should be revalued within the industry, and its presentation work should be categorised by a new term 'performed explaining'.

Chapter 6: Conclusions and Recommendations

This chapter draws together conclusions structured around the core concerns of the research questions and proposes that the contemporary Explainer role be viewed as the most recent phase in a lineage that can be traced back to nineteenth-century lecture-demonstration practices at the RI. Other conclusions focus on the specific ways in which traces of nineteenth-practices can be found in the various stages of the lineage; shifting attitudes towards the iterations of the role in terms of status, value and expertise; and what the research has revealed about cultural and historical views of the SMG. Reflecting the collaborative nature of the research, the concluding thoughts take the form of recommendations for consideration by the partner organisation and broader industry, alongside suggestions for future research.

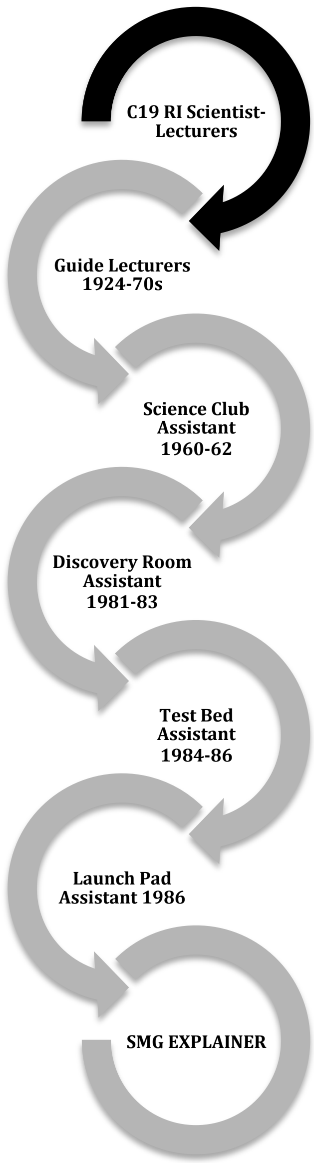
Chapter Two
Nineteenth-century perspectives

2. Introduction

In Chapter 1 (1.5) I introduced the overarching theoretical concepts that have shaped this research: embodied knowledge transmission practices, intertheatricality and vertical transmission. This chapter illustrates how appreciation of these contributes to an understanding of certain nineteenth-century lecture-demonstration practices as the roots of contemporary SMG performed explaining. Neither contemporary performed explaining practices nor lecture-demonstration practices of the nineteenth century have been treated in this way before and this research therefore offers a new model that locates them within the realm of performance. Additionally in Chapter 1(1.2), I highlighted how a blend of historiographical and qualitative methodologies has been employed in this research. This chapter has a predominantly historical emphasis and explores certain approaches to scientific lecture-demonstration in the period 1802-1887, constructing one possible narrative of the trajectory of the roots of the contemporary Explainer role and practices. It particularly addresses the core research questions:

- What are the origins of current performed explaining in the SMG and what traces are evident from the practices of science lecture-demonstration in the nineteenth and early twentieth centuries?
- What does a critical lens of performance analysis offer to an exploration of performed explaining in the period 1802-1815?

In order to do so, certain archival sources held by the RI are used, such as Michael Faraday's own handwritten notes made following his observations of a series of Humphry Davy's lectures in 1812 that greatly inspired him as a young man. In addition, evidence is drawn from the published public lectures, letters and biographies of all three subjects and published eyewitness accounts, as well as certain visual images from the period. The chapter also draws on a range of literature from the disciplines of History of Science and Performance Studies. In terms of the diagrammatic presentation of how this chapter contributes to the lineage I construct, it establishes the roots and forms the first (top) section in the diagram below:



(*Figure 2.1*) Representation of Chapter 2 contribution to the Explainer role lineage

2.1.1 Chapter rationale

A predominant focus of the chapter is on certain aspects of the lecture-demonstration practices of three renowned and significant 'men of science': Sir Humphry Davy (1778-1829), Michael Faraday (1791-1867) and John Tyndall (1820-1893). All three made their names at the Royal Institution (RI), London, during the nineteenth century for their substantial contributions to their chosen fields (chemistry, electro-chemistry and physics respectively) and their discoveries and inventions, particularly in the cases of Davy and Faraday, shaped various aspects of the development of the modern world.[28] But it is for their particular flair and capabilities as lecturer-demonstrators, the ways in which their styles and approaches can be said to have influenced subsequent lecture-demonstration practices and the particular relationships fostering a transmission of practice that existed amongst them, that they have been selected as features of this research. I acknowledge that in foregrounding these three individuals I overlook the contributions of many other Resident Professors and scientists who have also contributed to the work of the RI in the period, but the imperative to focus on a small pool of subjects, and arguably those who most significantly advanced the development of lecture-demonstration practices in the defined period, excludes others from this investigation. Sophie Forgan's (2002) problematisation of the historiographies of the RI identifies that accounts are typically framed either by professorial periodisation or the 'often repeated version of the Institution's "true aims"' (2002: 18). This research uses both of these frameworks to different degrees. Also important to note is that since the RI continues to function in many of the same ways as it has over the last two hundred years or so, exploring its history is complicated by views of it as a living subject. As I show in this chapter, through the frames of vertical transmission and embodied knowledge transmission practices, a clear genealogy can be established that binds these three men to each other and forms the roots of the Explainer lineage that I construct. The chosen period of investigation for this chapter (1802-1887) has been identified since it broadly encompasses the active lecturing years of Davy, Faraday and Tyndall.

There is a further significant justification for locating the potential roots of SMG contemporary explaining practices in the lecture-demonstration practices at the RI and one that is tied to my selection of the three core subjects and the traditions of the practices that they established and sustained. My research has identified an important connection between the RI and ScM dating to 1954 when these two

[28] Their actual contributions are too numerous to cite and are not central to the core content of this thesis but to offer one example from each: Davy's invention of the miner's safety lamp (1813); Faraday's discovery of electromagnetic induction (1831); Tyndall's explanation for why the daytime sky is blue (1859).

organisations liaised over the establishment of lectures designed for secondary school and sixth form students, a relationship that led to ScM actively seeking to emulate the lecture delivery practices of its more established near-neighbour (See Sherwood Taylor: 1954 and Anon: 1954b). This mid-twentieth-century attempt by ScM to learn from, and even replicate the successful presentation methods and approaches established at the RI during the preceding one hundred and fifty years or so, offers an important and pivotal link in the Explainer evolutionary process, and is explored in detail in Chapter 3 (3.4.2). Core lecture-demonstration practices at the RI have altered remarkably little since their earliest days. The Christmas Lectures for example, established in 1825 as a course of lectures that were originally held at Christmas, Easter and Whitsuntide, had by 1827 under the management of Michael Faraday, been condensed to a series of six lectures presented only over the Christmas period. These lectures, delivered by one professor, featured exciting practical demonstrations with the aim of inspiring in children and young people an interest in a particular scientific area or subject. The Christmas Lectures series has been continually presented since 1827, with only a brief cessation in the years 1939-42 when wartime threat meant that central London was considered too dangerous for children. The contemporary versions exist in a virtually unchanged form and with the same emphasis on spectacular and exciting demonstration.[29] Similarly, the Friday Evening Discourse, also initiated in 1827 by Faraday, endures today with the same conventions, including: the wearing of formal dress by the lecturer and spectators with a drinks reception beforehand; the lecture itself being precisely one hour in length with the start and finish signified by the ringing of a bell; and the subject to be an account of new theories or discoveries with plenty of illustrative and exciting experiments on display. In the context of this research these RI traditions and practices justify an exploration of the work of three of its defining early practitioners and invite a tracing of the roots of contemporary explaining back to them. In order to offer a broader context, a brief summary of the early history of the RI and of science lecture-demonstration practices more generally, also forms part of this chapter.

[29] The lectures, televised since 1966, now have an increased global reach with annual live tours to Japan and Singapore, as well as a dedicated Internet channel broadcasting a changing selection of 14 lectures. (Royal Institution: 2014b).

To address the core research questions and their performance-focus, throughout this chapter, and indeed the thesis overall, I hold that the communicative practices of the RI lecture-demonstrators *is performance* (see 1.5.1). This view takes account of Schechner's (2006) observations of 'as/is' performance. Acknowledging that clear distinctions between what can be regarded 'as' performance and what 'is' performance are becoming increasingly difficult to define, Schechner contends that 'as' performance enables critical examination of things that would otherwise be denied. Such a view facilitates the exploration of a wide range of activities beyond what is seen on the stage, and connects with the previously stated notion (1.5) of performance being ubiquitous within contemporary culture. Considering what 'is' performance requires a focus on 'more definite, bounded events marked by context, convention, usage and tradition' (Schechner 2006: 49), the more orthodox views of performance. This approach advocated by Schechner, and Performance Studies theorists more generally, fully accepts that '[p]erformances are actions (…) The underlying notion is that any action that is framed, presented, highlighted, or displayed is a performance' (Schechner 2006: 2). The consciously constructed practices and boundaries, such as a formalising of the relationship between presenter and spectator, the adoption of a distinct time frame, the presentation of pre-determined and practised material, and the creation of a specific space, extant from the earliest examples of Davy's lectures (1802), enable the treatment of RI lecture-demonstration as performance. That the lecture-demonstrations were/are also perceived of as cultural elements of the societies that they serve further strengthens their connection to Performance Studies-associated interpretations.

The next section is contextual and offers a brief summary of the beginnings of the lecture-demonstration mode as well as a short introduction to the founding of the RI itself.

2.2 Early scientific lecture-demonstration practices

A strong public appetite for scientific knowledge and a thirst for discovery and invention is not a recent phenomenon in Great Britain. As many commentators observe, science has long played a part in the core cultural fabric of society (De Young 2011; Forgan 2002; James 2002; Morus 1998; Golinski 1992; Taylor 1988). In his book *Science as Public Culture* (1992) Jan Golinski assesses the advancing role of science (specifically chemistry), as a force for the transformation of politics and society, suggesting that even from the 1770s 'natural philosophers' such as Joseph Priestley (1733-1804) pursued the ideal of educating the populace in the laws of nature in order to 'free them from the ignorance on which corrupt authority was founded' (Golinski 1992: 8). Even before Priestley's pursuits, pioneers such as Francis Hauksbee (1660-1713) and J.T. Desaguliers (1683-1744) were experimenting with the idea of public science lectures in the coffee houses and inns of early-eighteenth century London, and both of these men also served as demonstrators at the weekly meetings of the Royal Society (est.1660). Charles Taylor, himself Professor of Physics at the RI between 1977-88 and a regular presenter of the lecture-demonstrations during that time, suggests that J.T. Desaguliers is regarded as the first real populariser of the demonstration mode, citing Desaguliers' preface to his *Course of Experimental Philosophy* (1763) in which he states that 'Without Observations and Experiments our natural philosophy could only be a Science of Terms and an unintelligible jargon' (Taylor 1988: 2). Even from these earliest practices then, it is evident that the method by which real clarity of meaning was best understood was the *visual presentation* of ideas. Sir Lawrence Bragg, who had a long association with the RI, corroborates this idea observing that most people recall being '"*shown"* this or that' (Faraday and Bragg 1974: 19 emphasis in original) when describing their experience of attending a lecture-demonstration.[30] Furthermore, Bragg connects the enduring effect and success of a lecture with its visual impact:

> The final result of the popular talk is measured (…) by the extent to which the audience recalls it afterwards, and this fixation of the image is effected by arousing an emotional response of interest and thrill.
>
> (Faraday and Bragg 1974: 19)

[30] Bragg's roles included various Professorial titles, Director of the Davy-Faraday Research Laboratory (1954-66), and Director of the RI itself (1965-66). His contribution to the relationship between the RI and ScM is explored in chapter 3 (3.4.2).

Traditions uniting science and practical illustration, in which notions of performance and the visual are pivotal, are then, long-standing and far-reaching. The credit for establishing the term 'scientist' is attributed to William Whewell, philosopher and gentleman of science, who in 1834 offered the following definition:

> We need very much a name to describe a cultivator of science in general. I should incline to call him a *Scientist*. Thus we might say, that as an Artist is a Musician, Painter or Poet, a Scientist is a Mathematician, Physicist, or Naturalist.
>
> (De Young 2011: 7)

That such a need arose signals a growing community of specialists who had by the mid-1800s become so great in number that a collective noun to describe them was required. The Victorian fascination with science is widely documented (De Young 2011; Lightman 2007; James 2002; Morus 1998; Knight 1986; Ironmonger 1958; Becker 1874) and part of the appeal of attending one of the many varieties of lecture-demonstration that were available was, as Iwan Rhys Morus identifies, for the opportunity to 'see and participate in knowledge in the making' (1998: 86). Those who could legitimately identify themselves as 'scientists', including those at the RI, performed some of these lecture-demonstrations and these undoubtedly attracted the wealthier echelons of society who could access the more reputable scientific sites. Indeed, such audiences were keen to attend, and to be seen doing so, presentations given by the 'big guns of science and the big shots of the news of the day' (Forgan 2002: 35) and it is these lecture-demonstration practices of approximately the first hundred years of the RI with which this chapter is chiefly concerned.

2.2.1. The development of the RI

This thesis is not concerned with a political and/or social history of the RI itself, others have provided this (James 2002; Caroe 1985), but a short contextualisation is necessary in order to locate its practices, and culture, in a broader setting.[31] The

[31] The establishment of the RI is well documented (James 2002 & 2000; Ironmonger 1958; Becker 1874; Paris 1831) The original proposal for what was ultimately to become the RI is credited to American-born Benjamin Thompson (1753-1814), more commonly known

Royal Institution of Great Britain was formally founded in 1799 when a group of fifty-eight wealthy and arguably forward-thinking aristocratic gentlemen, seemingly motivated by an interest in helping the country to harness and disseminate scientific knowledge for the benefit of industry and agriculture, each pledged the considerable sum of fifty guineas to contribute to its establishment and to secure the unreserved right to attend lectures. Iwan Rhys Morus' examination of the presentation and display of electricity in the mid-nineteenth century, *Frankenstein's Children* (1998), offers a discussion of the work of practitioners beyond the renowned Michael Faraday, with a focus on popular practices, and highlights the elitist attitude of the RI.[32] He suggests (1998:13) that these founding gentlemen were also motivated by a more cynical desire to prevent social unrest and potential challenge to the established social hierarchy. Gwendy Caroe's (1985) informal history of the RI bolsters this view, observing that 'science (…) was to be used as social welfare' (Caroe 1985: 3) – if it could in some way contribute to the improved production of food, then deprivation, and more importantly, dissatisfaction and unrest amongst the general populace could be alleviated. Bernard Becker's (1874) contemporaneous eyewitness documentation of the rise and progress of the numerous scientific institutions in London at that time suggests that the original plan for the RI was almost wholly philanthropic – a sort of shelter-cum-soup-kitchen where domestic appliances and fuel-saving devices could also be developed, tried, tested and displayed – but this benevolent element rapidly dissipated with the involvement of the aristocrats. In his exploration of scientific worldviews in the nineteenth century David Knight (1986) also notes how early intentions to bring science to both the working mechanics *and* the landed gentry failed, and the RI quickly became 'a research institute funded by subscribers who attended lectures' (Knight 1986: 134). A further observation regarding the breakdown in seeing through the early plans, the class division of audiences and in highlighting how the emphasis on provision for

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as Count Rumford, generally described as a colourful, charismatic and brilliant character. Having successfully secured the interest and patronage of the wealthy Sir Joseph Banks (1743-1820), President of the Royal Society, Rumford seemingly lost interest in developments and left England for the Continent where he remained until his death.

[32] See Bernard Lightman's monograph *Victorian Popularizers of Science* (2007) for a comprehensive account of a wide range of other London institutions, notably the Royal Polytechnic Institution and the Adelaide Gallery of Practical Science. This thesis notes the contribution made to nineteenth-century lecture-demonstration by such galleries, but is limited to an exploration of those evidenced at the RI.

lectures emerged, is provided by Humphry Davy himself in his address given on March 3rd 1810 entitled *A Lecture on the plan which it is proposed to adopt for improving the Royal Institution and rendering it permanent*. Here he describes how, despite the hope that the 'practical man' would benefit by learning the 'correct scientific theories' behind his work through observation of examples, disagreement arose regarding the type of models that might have been exhibited at the RI. Manufacturing companies were largely distrustful of the fact that the secrets of their inventions might be revealed through scrutiny of their machines whilst on display, and the patents that existed at the time offered them little in the way of full copyright protection. The lack of cooperation led to disagreement and Davy's lecture praises the 'higher classes of society' for their willingness to realise the original plans, while laying the blame for their lack of success firmly at the door of the manufacturers:

> So dignified a body as the Royal Institution could not humiliate itself by affording a place of exhibition for patent inventions, so as to be subservient to the selfish views or interests of individuals.
>
> (Davy 1810: 7)

> [Thus] the object which at first was only secondary, that of teaching the principles of the sciences, by Courses of Public Lectures, soon became the prime object.
>
> (Davy 1810: 11)

The tone of Davy's observations hints at the social complacency that those connected with the RI had already come to feel within just the first ten years or so of its life, and there is a sense that any threat to the, by then, established ways of doing things was to be quashed. Sophie Forgan's (2002) reflective observations on two hundred years of the RI likens it in its early years to a 'good club [with] comfortable chairs, daily newspapers and journals, indeed it was a haven of peace and quiet [with] lectures to attend (…) and social occasions in the form of the Friday Evening Discourses of some elegance' (Forgan 2002: 32). Caroe's retrospective, written from her perspective as Sir William H Bragg's daughter and thus having spent a large part of her youth living in the Resident Professor's flat at the RI, supports this view, describing it being in 1810 'the most elegant social and philosophic club in London' (Caroe 1985: 34). Despite an undoubted interest in securing fashionable status, and the associated financial assistance, there was also genuine and enduring interest at the RI in determining how scientific discoveries could impact on working life, and this focus on discovery and dissemination endured, perhaps unsurprisingly since the first fifty years of its life broadly encompassed the Industrial Revolution.[33]

2.2.2. Performance and entertainment in lecture-demonstration

The new Proprietors, as they became known, outlined the aims of the RI in an early mission statement:

> [An] Institution for diffusing the knowledge, and facilitating the general introduction, of useful mechanical inventions and improvements; and for teaching, by courses of philosophical lectures and experiments, the application of science to the common purposes of life.
>
> (James 2000: 3)

From its inception then, the RI's commitment to engaging an unscientific, if refined, public through live speech and practical demonstration was paramount. The use of the word 'diffusing' highlights the intention to disperse and broadly spread new knowledge, an intention to explain complex ideas and discoveries with the wider aim of improving the general quality of life. Scientific education and understanding partly for its own sake then, but also with a firm emphasis on social and economic advancement. Reader in History of Science at the RI (1997-2003), Frank AJL James, has written extensively on its culture and characters and suggests that one of the key reasons behind the founding of the RI was 'to exploit and sustain Britain's empire' (James 2010: 3) through activities such as advising on the chemical analysis of the water supply for the benefit of developing the Australian colonies (James 2010:4). But it is for the performance of spectacular experiments and lecture-demonstrations that the RI has arguably become best known, both now and in its earliest years. Davy's aforementioned 1810 lecture, in essence a celebration of the successes and achievements of the RI for the ears of its sponsors, outlines plans for increased and improved courses of philosophical and scientific lectures and also hints at a recognition of their function as entertainment,

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[33] Whilst historians debate the precise dates of the Industrial Revolution in Great Britain, there is acceptance that it broadly covered the period 1780-1850.

suggesting that through them 'much new information may be obtained, and that the gratification of curiosity and amusement may be connected with the progress of science' (Davy 1810: 24). This notion of amusement and pleasure to be gained from instruction is something that can be seen in all the forms of lecture-demonstration/performed explaining explored in this thesis and in these examples first appears at the RI in 1802 with the influence of Humphry Davy (James 2007; Morus 1998; Golinski 1992; Hartley 1966; Paris 1831). Davy's brother John, wrote in his memoirs (Davy 1836: 259-260) that Humphry understood very early on the importance of presenting the demonstrations almost as artifice and observed that the 'theatre experiments' presented to the public were a simplified version of laboratory practices, designed to impress and instruct them.[34] Faraday's handwritten notes, drafted following his attendance at Davy's 1812 lecture series are testament to this and offer a useful window into precisely how Davy might have orally presented himself, capturing this simple, instructive quality. The notes for each lecture follow the same three-section format: 1) the lecture itself, written as a sort of transcript of Davy's words and presumably based on a combination of Faraday's memory of the event and notes he may have scrawled during the actual lecture; 2) a list of experiments performed; and 3) a practical description of how each experiment was conducted from the spectator's (Faraday's) perspective. Thus, accounts of the first experiment in the first lecture, for example, offer the following evidence:

> (Exp. 1) Light is now radiating from this candle (…) If I interpose my hand between the table and the flame a shadow of my hand is produced on the table [.] My hand intercepts certain rays that would otherwise have fallen on the table.
>
> (RI MS F/4/A: 5)

> Mr Davy lighted a candle and placed it on the table [.] It of course illuminated the table and the objects (…) He then held his hand between it and the table and a shadow was thrown on to the table [.] The shadow was

[34] It is acknowledged that their fraternal relationship likely influenced John's account of his brother's life. Indeed, he publically disputed much of John Paris' biography (1831) for the ways in which it sometimes critically presented Humphry, and his own version (1836) was in one way, an attempt to redress this. Nevertheless, Humphry's skill as a producer of spectacular and entertaining lectures is widely undisputed (see examples later in this section).

> of course in a right line with his hand and the flame which Mr Davy bade us notice as proof that light proceeds in right lines.
>
> (RI MS F/4/A: 67)

This straightforward tone is used throughout the notes and conveys a clear impression of Davy behaving in demonstration mode. The effect is of a form of script of Davy's words that enable the reader to visualise a possible enactment of what he was doing as he spoke. Beyond his own observations that serve to confirm Davy's actions ('of course') Faraday does not offer any description of the impression or effect Davy's lecture-demonstration practice had on the audience. Later, in the third lecture however, he gives an account of Davy's inhalation of nitrous oxide that suggests the latter's appreciation of the need for the inclusion of an entertaining element, but one that did not push too far beyond acceptable limitations of social behaviour:

> It produces a very pleasing sensation and I have no doubt that if I were to continue it for a few minutes longer I should make a very interesting exhibition to the company _ _ _ _ but I would rather be excused.
>
> (RI MS F/4/A: 211)

> Mr Davy applied his mouth to the end of the stopcock and inhaled a portion of this gas two or three times. Farther he would not go tho' he said he had no doubt that he should have entertained the company very pleasantly.
>
> (RI MS F/4/A: 271)

In spite of Davy's reputed proclivity towards the recreational use of nitrous oxide (Knight 2002b: 110; Caroe 1985: 21) he apparently understood the imperative for maintaining the artifice of the lecture-demonstration mode.

Notions of the artifice of performance are not new to scientific lecture-demonstration practices and descriptions of them that utilise theatrical metaphors have been previously offered. For example, practitioners are referred to as actors on a stage (De Young 2011: 202; Meadows 2004: 4; Taylor 1988: 55; Bragg 1974: 5); the crafting and preparation of the lectures is compared with the 'same care in production as a play in the theatre' (Eve and Creasey 1945: 44); the RI's fully operational basement laboratory is described as the 'backstage' (Morus 1998: 14) of the small lecture theatre to which it was adjacent; and the demonstration apparatus likened to 'the props and scenery of a repertory company' (Caroe 1985: 131). These are though, rather reductive images offering only superficial comparisons.

Humphry Davy's arrival at the RI in 1801 and rapid rise to Professor of Chemistry in 1802 is well documented (Morus 1998; Golinski 1992; Thomas 1991; Hartley 1966; Davy 1836; Paris 1831) along with accounts of how he quickly eclipsed his predecessors and fellow lecturers due to his apparent remarkable degree of 'fluency and power of illustration' (Becker 1874: 38). Such accounts present Davy as unrivalled in his time as an orator and Becker's description of his first public lecture, on the properties of gases, offers a view of him that is generally echoed by others:

> At the first lecture the variety and ingenious combination of his ideas, and the fire, vivacity, clearness, and novelty with which they were expounded, enchanted the few who came to listen to the young lecturer, in whom they found united the power of poetry, oratory and philosophy. The second lecture was crowded, and his course was obliged to be removed to the large amphitheatre, whither his fervid genius, and in some degree his youth and good looks, drew immense audiences. The ladies were charmed by the handsome young lecturer, and never tired of praising the beauty of his eyes, which they declared were 'made for something besides poring over '.
>
> (Becker 1874: 35)

Becker's portrait of Davy reads rather like a celebrity review focusing on his attractive physical qualities, poetic oratorical skill and instant crowd-pulling capacity, and the suggestion of his bewitching appeal for audiences, both male and female alike, also appears in other accounts of his work (Golinski 1992; Caroe 1985; Williams 1965; Davy 1836; Paris 1831). That he was vain is also widely undisputed, but these impressions of him do not provide any recognition of his fundamental understanding of the impact of practical and visual demonstration in offering real appeal to audiences. It is Davy who is uniquely credited with bringing to the RI from its earliest years, the staging of 'spectacular and entertaining, not to say dangerous, demonstrations of scientific experiments' (James 2000: 5). The presentation of science to the public had to have very broad appeal and an offer that could stand up to scrutiny and comparison with the glorious visual spectacle offered by other forms of entertainment. As Jim Davis and Victor Emeljanow show in their comprehensive analysis of theatregoing publics, *Reflecting the Audience: London Theatregoing, 1840-1880*, 'there was no such thing as a Victorian audience, but rather a variety of audiences, embodying a wide range of perspectives' (Davis and Emeljanow 2001: 229). Accepting this notion as true for theatrical entertainments, it follows that it is likely to also be true for the available range of scientific lecture-demonstration, and there must therefore have been an imperative to create such experiences with a broadly entertaining appeal. That Davy understood this as early as 1802 indicates a level of cultural awareness well ahead of his time.

Davy rapidly established a name for both himself and the RI as a first rate, upper class destination for providing entertaining and educational scientific encounters. Following in his footsteps, and perpetuating the reputation for *showing* vibrant practical science in action, came Michael Faraday, with the previously described highly regarded Christmas Lectures inspiring and engaging young people through spectacular demonstrations of scientific principles, and still going strong today.

Davy's success as a lecturer invited inspiration and imitation and it is certain that his influence on Michael Faraday was strong. Numerous accounts of Faraday's early life (James 2010; Meadows 2004; James 2002; Thomas 1991; Morus 1998; Golinski 1992) present the narrative of how, as a young man with a keen interest in self-improvement and apprenticed to a bookbinder, in 1812 Faraday was given tickets by a customer to attend a series of Davy's RI chemistry lectures. Greatly inspired by what he saw, Faraday meticulously wrote up all his notes from the lectures, previously cited, and presented them as a beautifully bound gift to Davy himself. This act of devotion brought Faraday to Davy's attention and ultimately, as a result of numerous fortuitous events for Faraday, led to Davy's suggestion in 1813 that he take up the position of laboratory assistant at the RI, becoming Davy's 'fag and scrub' (Williams 1965: 30), and later still, as his skill and dexterity were noticed, facilitated close collaboration with his idol.[35] In turn, Faraday himself

[35] Davy's eyes were injured in a laboratory accident and Faraday was temporarily appointed as his scribe. Later, a further laboratory mishap led to the dismissal of Davy's assistant and Faraday was appointed in his place. These events are well documented (Porter 1974; Davy 1836; Paris 1831). James (2010) disputes the popular vision of

became the subject of admiration and emulation when John Tyndall took up the post of Professor of Natural Philosophy at the RI in 1853 and found in Faraday both a 'valued friend' and 'professional mentor' (De Young 2011: 78).

2.3. Considering the key theoretical frameworks

The following sub-sections interrogate the relationships between the three chosen RI subjects Davy, Faraday and Tyndall, in terms of notions of embodied knowledge transfer and vertical transmission. In addition, I enhance an understanding of their lecture-demonstration work through certain lenses of performance practice, exploring for example, notions of performer presence, as well as performance training techniques and preparation methods.

2.3.1.Models of vertical transmission at the RI

Sophie Forgan's study of the RI maintains that it offers a 'striking example of an institution where professorial lineages, research tutelage and personal influence on careers' (Forgan 2002: 27) can be found in abundance, pointing out that the relationship between Davy and Faraday has previously been analysed in terms of that of (surrogate) father and son.[36] This is certainly one plausible description of their association, not least because of the tensions and jealousies that sometimes arose between them (Morus 1998: 25) especially as the younger man, Faraday, began to carve his own successful career, ultimately establishing himself as the leading light at the RI. Here, I suggest that their relationship, and later, Faraday's relationship with John Tyndall, can equally profitably be examined within the framework of embodied knowledge transmission, and specifically through the lens of vertical transmission. In so doing, I propose that there was both a conscious and subconscious process of repetition and emulation of the presentation methods and techniques from one scientist-lecturer to the next. Although such a reading incorporates ideas of inheritance and transfer, it suggests a more deliberate influence than might be found within the father-son bond, emphasising an active intention to perpetuate existing practices and behaviours.   In Chapter 1 I

Faraday as assistant to Davy and suggests that although he frequently helped him in with experiments, Faraday was always separately employed by the RI (James 2010: 34).

[36] Forgan refers to David Knight's essay 'Davy and Faraday: Fathers and Sons' in Gooding, D. and James, F.A.J.L. (eds.) (1985) *Faraday Rediscovered: Essays on the Lifer and Work of Michael Faraday, 1791-1867*, London.

introduced the notion of vertical transmission (1.5.3.) as it applies to performer training practices, noting the importance of its use as a means of passing on embodied skills and knowledge. Particularly emphasised in this process is the value of 'imitation' (Schechner 1985: 22; Watson 2001: 3), as well as the 'master-disciple' status relationship, in which the 'master' has significant experience as a practitioner in their own right.

The process of vertical transmission as an intergenerational embodied training practice naturally established itself amongst the three subjects Davy, Faraday and Tyndall.[37] In this model each of the scientist-lecturers was an expert practitioner themselves – both in the laboratory and the lecture theatre – as well as a source of inspiration for the next generation. Compelling evidence of Faraday's adoption of a model of imitation comes from his own writing. In the first of a sequence of four letters to his friend Benjamin Abbott written between June 1st and June 18th 1813 (James 1991; Pearce 1971) Faraday reflects on his own journey towards becoming a lecturer and his experiences of watching others, particularly Davy at work, noting that ''tis evident that I have yet to learn and how to learn better than by the observation of others' (James 1991: 55). Faraday's instinct then, was for a process that enabled him to cultivate his own practice through the close scrutiny of others.

It would be misleading to suggest that such deep and intentional vertical transmission occurred from Davy to Faraday to Tyndall as that described by Watson in relation to East Asian forms of performance. Nevertheless, it is widely accepted that Faraday was inspired by Davy, and in turn, that Tyndall was greatly impressed and influenced by Faraday's performance in the lecture theatre as well as benefitting from a form of mentoring relationship with him in his own early lecturing career at the RI (De Young 2011: 78; Ironmonger 1958: 149; Eve and Creasey 1945: 44). In her study of Tyndall and the role of the scientist in Victorian culture Ursula de Young cites Tyndall's own journal entry from December 29 1853 in which he describes the possibility of inheritance from Faraday:

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[37] This model could also be applied to subsequent generations of professors at the RI, including the actual father-son relationship of WH and Lawrence Bragg, which in addition to their blood ties, can also be viewed in terms of master and apprentice.

> Once he turned his face towards me with kindness and at the same time chastened by something higher. Tyndall, he said, I should like you to love this Institution, to identify yourself with it. In the course of nature I shall soon pass away – and he said something else which seemed to indicate that he wished me to fill his place.
>
> (De Young 2011:80)

This insight into Faraday's presumed intentions bears all the hallmarks of a master passing down his legacy to a chosen apprentice, in the same way that Faraday himself ultimately succeeded his mentor Davy as the 'most popular scientific lecturer in London' (James 2007: xv). This opportunity for direct vertical transmission was naturally established and fostered amongst them. Indeed, the RI lecture theatre itself could be seen as a kind of training ground for future scientist-lecturers, where they could test out practices and approaches inspired by what they witnessed in the performances of others, selecting from those performances the methods and physical tropes that they wished to recreate for themselves.

2.3.2. Intertheatrical readings and embodied practices

So how does this transmission of knowledge relate to Bratton's conceptualisation of intertheatricality (see 1.5.2), what she calls a 'knowingness' (2003: 37) built on the individual's experiential memory of performances and their contexts and influencing all their future interpretations? For Bratton, and others who have expanded her theory (e.g. West 2013), this process occurs horizontally in that its effects reside within the individual and thus do not transcend generations. They are not, in addition, responsive to determined intent. Bratton envisages a network of connections and references stemming from multiple performance experiences that become woven together in the memory of the spectator, subconsciously shaping and influencing their reactions to, and understanding of each new performance experience they have. If one extends this essentially horizontal mode of thinking to incorporate the mechanism of vertical transmission, the experiential memory of individual spectatorship (in Bratton's model) becomes, instead, the transmission of intergenerational embodied practice. From this perspective the known physical presence of Faraday at Davy's performances, and in turn, Tyndall's documented observations of Faraday's lectures can be said to have both consciously and strategically shaped the formation of their own presentation styles. I suggest here that the process of intertheatricality as expounded by Bratton lends a starting point to a broader interpretation of the ways in which transmission of performance behaviours and practices can be said to have occurred amongst the selected nineteenth-century scientist-lecturers, and further beyond in time.

Such a notion resonates with Bloom et al's (2013) interpretation of intertheatricality (see 1.5.2). They highlight the 'lingering 'quality of performance and the possibility of 'reverberation' that might even be seen as 'exploding the confines of synchronic temporality' (Bloom et al 2013: 167). They hint at the possibility of performance that is reiterated in future time frames, surpassing Bratton's singularity and West's 'horizontal' boundaries. It is in this way that traces of the habits of Davy's original presentational form and structure can be said to have persisted and been passed on, or 'disseminated' (Bloom et al 2013:167), through the memories and importantly, the *embodied experience* of subsequent generations of RI practitioners. Faraday's close scrutiny of Davy's performance methods in particular, is well documented (James 2002a: 122; Morus 1998: 19; Thomas 1991: 18; James 1991: 55-65; Pearce 1971: 49-58). His four aforementioned letters to his friend Benjamin Abbott in 1813 (James 1991; Pearce 1971) in which he describes the 'most prominent requisite to a lecturer' (James 1991:60), and sets out his own ideal model, serve as clear evidence of his careful consideration of Davy's performance and his own subsequent appropriation of certain techniques and rejection of others.[38] Faraday's 1813 correspondence with Abbott reveals that he also observed several other RI lecturers at the time, and had the 'opportunity to see at close quarters some of the best lecturers at work' (James 2010: 91) including the RI's William Thomas Brande, but also visiting lecturers such as architect John Soane, poet Thomas Campbell and musician William Crotch (James 2010). Such a breadth of styles and content must surely have stimulated in Faraday an appreciation and interpretation of the 'mesh of connections' (Bratton 2003: 37) between them. Nevertheless, it is Faraday's close affiliation with Davy

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[38] Faraday's 1813 correspondence with Abbott reveals that he also observed several other RI lecturers at the time, but his close affiliation with Davy and high regard for him, make Davy a particularly strong figure of influence for Faraday. See James, F.A.J.L. (1991), Williams, L.P. (ed.) (1971) and Jones, B. (1870) for publication of Faraday's letters to Abbott. It was to be ten years before Faraday could actually begin to put his ideas into practice in his own lectures, but when he finally did, he was remarkably influenced by these early observations.

and high regard for him that make Davy a particularly strong figure of influence for Faraday. Elements of West's (2013) intertheatrical definition that accommodates a 'slowly changing' (2013: 156) repertoire over time can be seen in Tyndall's approach. Far showier and more spectacular in his lecturing style than his mentor Faraday's, Tyndall 'recognised that, because of his own quite different personality traits, he could never hope to bear Faraday's unique "mantle" with the same effect' (de Young 2011: 84). This is evidence, then, of an absorption of practices and techniques from master to disciple, but with 'continually moving, dissolving and re-forming pattern[s]' (Bratton 2003:38) as the practice shifts and is re-invented from practitioner to practitioner.

Ultimately, I suggest, through subtle acquisition suggested by intertheatrical readings, and also more carefully considered actual emulation, the performance models at the RI also came to influence presentational practices of those outside it who observed/experienced performances there.[39] This is one important way in which those practices from the nineteenth century can be seen as reverberating in contemporary explaining practices. As articulated in Chapter 1 (1.5.1), these notions of intertheatricality can also be viewed alongside the ideas of two other prominent Performance Studies theorists Richard Schechner and Marvin Carlson. Schechner's (2006) conceptualisation of restored behaviour, like Bloom et al's notion of intertheatricality, enables an understanding of performance, in this instance, of lecture-demonstration, as being constructed out of the 'debris of past performances' (Bloom et al 2013:181). Similarly, Carlson's (2003) suggestion that all the constituent parts of theatrical production, or lecture-demonstration, can be regarded as a 'recycling' of other performance has a bearing on this idea. Referring to performances as 'ghostly tapestries' (2003: 165) Carlson constructs the possibility of past experiences and memories that are woven together for the audience, to form a new moment that arises out of these pasts. He identifies one of the ways in which this is theatrically achieved as being the use of 'orientation aides in the form of such devices as already known plots, already familiar characters, already experienced situations' (Carlson 2003: 166). This idea can be mapped onto lecture-demonstration practices at the RI in that they typically follow a

[39] The influence of RI lecture-demonstration practices on ScM Guide Lecturers in 1954 is explored in (3.4.2).

specific pattern easily recogniseable to the nineteenth-century audience, and through repeated use, remaining familiar to audiences of today: a verbal address that explains scientific phenomena, often of a similar length (an hour); the inclusion of practical demonstrations, often using quotidian objects, to illustrate the ideas explained; one single scientist-lecturer who is often supported in the demonstrations by an assistant; a presentation space that conforms to a pre-existing model. All these elements combine to establish an enduring and familiar tradition that is associated with the form, assisting the spectator in their sense-making of the experience, and bonding each new lecture-demonstration with those from the past.

This notion resonates with the sentiments expressed by Professor of Structural Biology Stephen Curry, writing in 2013 about his own experiences of delivering a Discourse at the RI:

> The sense of occasion is heightened by the connection with the past. The fact that I have given a Friday Evening Discourse at the Royal Institution will warm the cockles of my heart for the rest of my days because there is now a thread though history that connects me to previous speakers, the likes of Faraday, Huxley, Rutherford and Hodgkin. I claim no degree of equality with these celebrated scientists — seriously, I don't — but that slender, unbreakable thread tickles me.
>
> (Curry: 2013)

Curry's 'slender, unbreakable thread' ties his own performance back through history to those presentations given in the same place almost two hundred years before him, the residue of the earlier forms reverberating in the space once again as they are recalled, re-embodied and re-presented through Curry's contemporary actions.

Back in the nineteenth century, once Davy became established as a scientist-lecturer at the RI his work offered plentiful opportunities for others to learn from him via observation of his performances and as previously noted, Faraday used this approach to begin to identify those elements that he regarded as successful (or not) performance strategies as soon as he arrived there in 1813.[40] Through scrutiny of Davy's approach, after only three months he had established the blueprint for his own method that was to remain constant for his entire lecturing career, his ideas extensively recorded in the previously cited letter correspondence with his friend Benjamin Abbott during June 1813. These letters can be seen as providing tangible traces of how Faraday intended, and might even have actually appeared as a performer or lecturer – they are sources that offer a clear indication of his intentions and thoughts.

Revisiting Diana Taylor's (2003) tension between 'archive and repertoire' (see 1.5.1), it can also be seen how first Davy's, then Faraday's, and later still Tyndall's physical actions as lecturer-demonstrator form an 'embodied repertoire' that was, and indeed is, transmitted through the subsequent generations of RI lecturer-demonstrators. Significantly, it is the physical presence of each of the scientists that ensures this transmission of the repertoire - 'people participate in the production and reproduction of knowledge by "being there"'(Taylor 2003: 20). As I have suggested, it is known for certain that they did indeed physically witness each other at work in this way, each of them participating in the production, reproduction and then transmission of the 'flexible and unfixed' actions of the embodied knowledge. In turn, ultimately each of them came to embody certain elements of those practices themselves, and the repertoire can be said to have been 'restored' (Schechner 2006) in subtly different ways in their own practice.

Morus hints at a similar notion in the introduction to his book *Frankenstein's Children* when he suggests that:

> In order to replicate an experiment, the experimenter needs more than a simple literary account of the apparatus and means of manipulation. He or she must be situated in a context that shares with the original experimenter a whole repertoire of unarticulated skills, practices and assumptions. They must share the same tacit knowledge.
>
> (Morus 1998: 10)

[40] In Chapter 5 (5.5.1) I explore how this method of learning via observation and replication is evidenced in the practices of contemporary explaining in the SMG.

Although Morus is writing about the difficulties of exact replication, as opposed to the transmission of broadly similar skills and practices, also going on to highlight the importance of the surrounding associated material culture and how this will influence each set of practices, there is here definite recognition that a shared repertoire of embodied knowledge can exist across contexts. Thus, Morus' 'tacit knowledge' operates in much the same way as Taylor's 'repertoire'.

The combination of tangible documentation (in this instance Faraday's letters and later his writings on training for lecturing, independent accounts of lectures given, pictorial images and later still, televised lectures at the RI) and embodied knowledge practices may be assembled to construct a clear lineage of transmission. Furthermore, as illustrated in Chapter 3, this lineage can be projected forwards to the period in the mid-1950s, when ScM Guide Lecturers observed the lecture-demonstrations of RI professor Lawrence Bragg, the embodied repertoire of the nineteenth-century practices of lecturing living on and inspiring continued replication. This is one of the most important ways in which the lineage of the contemporary SMG Explainer can be traced back to locate one branch of its roots in nineteenth-century RI approaches. The fleeting moments of performance that constitute each lecture-demonstration become inscribed in the memories and experiences of those who witness them, and in the cases of the scientist-lecturers who follow on, the practices are re-imagined and re-presented through their own performances. To re-state Taylor's idea, 'Forms handed down from the past are experienced as present' (Taylor 2003:24). Crucially, as noted (1.5.1), Taylor insists that the 'repertoire requires presence' (2003: 20), that in order for transmission to occur the physical presence of participants is needed and a process that enables a reiteration of already performed actions is kick-started. Faraday himself shared a similar view that physical presence could effect some form of change or influence. During a lengthy correspondence with his friend Abbot during September 1812, in which he argues with Abbott over the properties and effects of chlorine as demonstrated by Davy in a series of lectures that Faraday observed, he stresses the importance of actually being there in order to believe in and be altered or affected by what is seen:

> I have seen Davy himself support it [.] I have seen him exhibit experiments conclusive experiments explanatory of it and I have heard him apply those

> experiments to the theory & explain and enforce them in (to me) an irresistible manner [.] Conviction Sir struck me and I was forced to believe him and with that belief came admiration [.]
>
> (James 1991: 19)

In an early example of the physical transmission of ideas, Faraday's writings here reveal how he proposed the re-staging of what he had seen performed by Davy in order to persuade Abbott of his opinion, so that 'the performance would give us a clearer idea' (James 1991: 28). The presence of Abbott at such an event was critical to Faraday's notion that this would enable him to be influenced by what he had seen.

2.4. Supporting performance perspectives

In keeping with the stated research aim to use certain performance perspectives in order to understand better, in this instance, practices at the RI (core research question 2), the following sub-sections briefly explore theatrical lineages as an additional model of comparison and a further echoing of vertical transmission. In addition I suggest how the contexts of theatrical performances might be seen to have had an intertheatrical effect on the nineteenth-century perspective. Furthermore, 2.4.2 explores notions of theatrical event and presence particularly in the context of their transformative effect on the spectator.

2.4.1 Broader intertheatrical contexts

Resonances of vertical transmission can be found in some European theatre practices of the nineteenth century whereby a key element of an actor's training was a form of apprenticeship, largely conducted in provincial theatre productions. Robert Gordon describes how apprentices:

> [L]earned by imitating leading actors or visiting stars who joined the company for a season. When an actor felt sufficiently confident of his own abilities, he would begin to vary the interpretation and execution of his own roles.
>
> (Gordon 2006: 26)

The 'stars' included names such as Edmund Kean (1787-1833), William Charles Macready (1793-1873) and Henry Irving (1838-1905), all of whom served time learning their trade in the stock companies of the provinces before finding fame in the grand theatres of London.[41] Taking into account Postlewait's suggestion of the historian's negotiation 'between matters of possibility and plausibility' (Postlewait 2007: 2013) and Carolyn Steadman's 'politics of imagination' (Steadman 1998: 73) (see 1.2.2), I suggest that Davy, Faraday and Tyndall may have witnessed some of the theatrical performances of actors of this ilk and been impressed by their power and ability to hold the attention of their audiences. Bratton's model of intertheatricality would facilitate understanding of their experiences of performances in this context as influential, indeed critical, to their capacity for sense making. Extending this model to include West (2013) and Bloom et al's (2013) notions of intertheatricality would also incorporate the possibility that spectatorship of these events enabled subsequent reiteration and repetition in the spectator's (i.e. Davy, Faraday, Tyndall) own performances.

Certainly it is possible that Davy and Tyndall attended the theatre. Davy's hectic social life and love of fashionable society (Caroe 1985; Davy 1836; Paris 1831) might have encouraged him to see and be seen at London's fashionable theatres. He was known to have an 'instinct for the dramatic in both demonstrations and in structure of the lecture in such proportions as to captivate any audience' (Williams 1965: 323) and this instinct may have blossomed intertheatrically under the influence of theatrical entertainments. Until his marriage in 1876 at the age of 55, Tyndall was known to have sought an active and varied social life amongst an eclectic mix of the 'intellectual aristocracy, the new professionals [and the] old cultured upper class' (Caroe 1985: 74). Similarly it may be suggested that some of his socialising would have facilitated encounters with various theatrical entertainments. More concrete and precise evidence could be found regarding Faraday's experience of other theatrical forms. Selected items from Faraday's correspondence reveal that he was familiar with both pantomime and opera.[42]

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[41] Henry Irving lived for almost 30 years in a flat less than 100 yards from the RI on Abermarle Street and in February 1895 gave a special afternoon lecture there on 'Acting and Art' as part of a programme of more diverse 'Discourse Speakers' initiated by James Dewar in 1887. Irving's crowd pulling ability was such that he attracted an audience of 1050. (Thomas 1991:176).

[42] It is known that Faraday made a generous financial contribution to the actor W. C. Macready's plan for a publicly funded monument dedicated to actress Sarah Siddons to be erected in Westminster Abbey. It may be assumed that he must have admired her having seen her in performance. (Letter 1342, dated March 1 1841 (James 1996).

Letters exchanged between him and Miss Angela Georgina Burdett-Coutts, of the Coutts banking dynasty, reveal that on at least three occasions she lent Faraday, his wife and niece, her private Box at the Theatre Royal, Drury Lane. Here the Faradays enjoyed a performance of *See Saw, Margery Daw* in January 1857 and Verdi's *Il Trovatore* in May 1859.[43] Nevertheless, by his own admission Faraday was not a regular theatregoer, writing to Miss Burdett-Coutts on January 25 1860 following a visit to an unnamed pantomime:

> We last night enjoyed ourselves under your kindness and I thank you heartily for the enjoyment and your kind note (…) We do not often go to the theatre.
>
> (James 2008: Letter 3711,639)

Faraday's appreciation of performance as exhibited through his attention to physical and vocal impact in the lecture theatre, as well as his understanding of the effect of demonstration, can be seen then as evidence of being both deeply intuitive and potentially as a model of intertheatricality. Further enhancing this idea is the knowledge that the time spent by Faraday in his youth as a bookbinder's apprentice was alongside two other apprentices. Both of these went on to forge performing careers: one became a professional singer and the other a well-known comedian (Williams 1965: 10). Faraday's early exposure to them might perhaps have influenced his appreciation of the performance values associated with their chosen paths and in some small way impacted on his meticulous attention to detail when performing his own lecture-demonstrations.

Although necessarily involving speculation, it can then be suggested that contemporaneous theatrical performances might have influenced Davy and Faraday's approaches to their own RI presentations. The next section explores aspects of nineteenth century lecture-demonstration as theatrical event, with an emphasis on how they can be seen as effecting transformations.

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[43] Letter 3219, from Faraday to Burdett-Coutts, dated January 1 1857; Letter 3594, from Burdett-Coutts to Faraday, dated May 11 1859 (James 2008).

2.4.2 Theatrical event and performer presence in 19th-century lecture-demonstration

On May 6 1854 John Tyndall watched Faraday deliver the lecture *Observations on Mental Education* at the RI. Apparently moved by what he saw, he wrote about the effect Faraday appeared to have on the audience:

> At intervals you could feel his powerful spirit, as it glowed underneath his utterance and made it deep and musical, while the audience seemed lifted by a billow and held suspended between earth and heaven.
>
> (Eve and Creasey 1945:51)

Others have similarly described Faraday's impact on audiences (Alley 2003:17; Morus 1998: 30; Thomas 1991) highlighting his passion and the way in which he appeared to foster a distinct, almost personal connection with spectators. Writing here from the perspective of spectator Tyndall offers a description of Faraday's performance that is somehow mystical and other worldly, suggesting the creation of a profound effect on the audience, presumably including himself, whereby the conditions of time and space seem temporarily altered.[44] While it is impossible to know precisely what Faraday was actually doing during the lecture, Tyndall's account conveys the impression of a wave-like pattern of moments of intensity in his communication, 'at intervals (…) glowed (…) lifted by a billow (…) held suspended', that had a powerful effect on the audience drawing them in and holding their attention. Wilmer Sauter's (2000) discussion of the transformative effect of the theatrical event assists an understanding of what might have been occurring in this moment described by Tyndall. Underlining the importance of its transitory status, as something that is created in the specific moments of interaction between performer and spectator, Sauter's theorising of the theatrical event, and in particular his analysis of what occurs between stage and auditorium, or in this instance, between demonstration bench and auditorium, posits a model of *sensory-artistic-symbolic* communication (Sauter 2000: 2). In *The Theatrical Event* he argues that the concept of a work of art has inescapable connotations of

[44] It is acknowledged that Tyndall's deep personal admiration for Faraday may have enhanced his impression of the experience, although Faraday's reputation as an excellent orator is widely undisputed.

something that is ‘produced, distributed, consumed’ - it can be returned to and experienced over and over. The event of theatrical performance, however:

> includes both the presentation of actions and the reactions of spectators, who are present at the very moment of the creation. Together the actions and reactions constitute the theatrical event.
>
> (Sauter 2000:11)

In essence then, the theatrical event occurs only in the immediate, present moment, is experienced at the same time as it is created, and ends almost immediately that it has begin. Sauter adds a further dimension that includes the three levels seen as necessary for the understanding of theatrical event as a communicative art form (2004: 1; 2000: 7):

- sensory – the interaction between performer and spectator experienced in personal terms
- artistic – the creative elements that may or may not be appreciated by the spectator, that ensure the theatrical event can be differentiated from real life – it is an artificial process
- symbolic/fictional – the meanings that are constructed by the spectator as a result of the artistic/creative actions of the presentation

By his own definition Sauter’s theoretical model may be applied to both past and present performances, observing that once the specific moment of performance is over, it has in any case, immediately become historical, residing in the past, and employing it as a tool for considering bygone performances might only perhaps be hindered by absence of remains and documentation.

These specific moments highlighted in the documentation of Tyndall’s description above can be regarded as representing the *sensory* element of Sauter’s model, with spectators feeling momentarily ‘lifted’. Notions of temporarily suspending or altering perceptions of time and space resonate with Polly Williams’ (2011) findings concerning the transformative qualities inherent in performed interpretation in the industrial museum (see 1.4.3). That a similar sensorial transformative effect was manifesting itself amongst the audiences of certain nineteenth-century RI scientist-lecturers, positioned here as the roots of the contemporary SMG Explainer, enhances views of the two roles as having parity and augments notions of comparison between them.

Tyndall's musical metaphor and exploration of its relationship to Sauter's model of theatrical event also offers an *artistic* communicative component that can be understood on two levels. Firstly as something consciously crafted and rehearsed in order to have a particular intended effect, the wave-like rhythm of his utterances deliberately designed to captivate the audience. Faraday's own writings provide evidence of his desire and deliberate intention to produce specific effects. In *Advice to Lecturers* (1974), a short publication formed from a combination of extracts of the writings of Faraday and Lawrence Bragg, Faraday expounds his notion of lecturer attitude and behaviour:

> A lecturer should exert his utmost effort to gain completely the mind and attention of his audience, and irresistibly make them join in his ideas to the end of the subject. He should endeavour to raise their interest at the commencement of the lecture and by a series of imperceptible gradations, unnoticed by the company, keep it alive as long as the subject demands it.
>
> (Faraday and Bragg 1974: 19)

Faraday's suggestion of 'imperceptible gradations' in the delivery that are designed to subtly and unconsciously affect audience response give clear indication of his structuring and preparing of an experience for them. The second artistic interpretation at work here hints at notions of intertheatricality. Tyndall applies his previous experience of other artistic forms - in this case music - to assist his appreciation of the aesthetic elements of the performance before him. In this sense it is as though he is subconsciously recalling the effects a musical performance may have had on him, transporting and uplifting him, and transposing these onto the effect created by Faraday's oratorical delivery. Without the prior experience of the musical effect, Tyndall would be less able to construct or make sense of the lecture experience in this way. In turn, being present for Faraday's delivery would influence future iterative and interpretive behaviours for spectators, including Tyndall.

Finally, Sauter's model requires a *symbolic* level of interpretation. This is more imprecisely gauged using the available evidence available, although it can be located in Faraday's reputed desire to tailor each performance to his audience needs (Alley 2003; Morus 1998) and ensure that the content of his lectures was intelligible to all. In this sense, the entire performance of the lecture-demonstration operates as a symbol of the knowledge that is being imparted and the change that comes over the audience as they move from a position of ignorance to understanding.

There is more to be extracted from a consideration of the transformative effect of altering perceptions of time and space. A comparison of Tyndall's previously described account of a scientific lecture delivered by Faraday, with British theatre producer and revolutionary designer Edward Gordon Craig's eyewitness account of actor Henry Irving's 1871-2 performance of Mathias in Leopold Lewis' 1867 play *The Bells*, yields a similar effect of the suspension of time and space:[45]

> Irving was buckling his second shoe, seated, and leaning over it with his two long hands stretched down over the buckles. We suddenly saw these fingers stop their work; the crown of the head suddenly seemed to glitter and become frozen – and then, at the pace of the slowest and most terrified snail, the two hands, still motionless and dead, were seen to be coming up the side of the leg (…) the whole torso of the man, also seeming frozen, was gradually and by an almost imperceptible movement, seen to be drawing up and back, as it would straighten a little and to lean against the back of the chair on which he was seated.
>
> (Irving 1951:194)

Gordon Craig watched Irving in the role more than thirty times and, apparently profoundly affected, described his performance as 'the finest point the craft of acting could reach' (Nightingale: 2011). It may be said that Irving, as an actor produced the same kind of transformative effect amongst his audiences as did Faraday as a scientist-lecturer. Sauter's three perception-presentation levels are evident in Gordon Craig's description: the sensory impact of the performer's

[45] Widely regarded as Irving's greatest success, George Rowell notes that it was his characterisation of Mathias that enabled Irving to take a 'significant step towards immortality' (Rowell 1988: 467). Irving played the role frequently during the thirty-four years after his first performance, including just two nights before his death in 1905.

actions on the spectator is clearly suggested through icy metaphors: 'glitter (…) frozen (…) motionless (…) dead'; the entire account is weighty with the impression of actions that are very precisely constructed and executed to generate a specific effect and there is no doubting here that Irving is an artist at work; the painstakingly slow actions creating an atmosphere of dread symbolic of the character's creeping and all-consuming guilt at the murder he has committed. There is also an evocation of an almost mesmeric quality and a strong sense of what might now be called 'presence' in both the above accounts, a notion that connects very closely with Sauter's thoughts concerning the interaction between performer and spectator. John Harrop (1992) defines an actor's presence thus:

> The actor fills the moment, and his or her energy radiates out into space to draw in the audience with the power of the magnetic field set up. The actor is a transformer, plugged into the energy of the universe, capturing and transforming that lightning into communicative energy. The more kilowatts per instant the actor can radiate, the more will be his or her power in the moment and the stronger the presence.
>
> (Harrop 1992: 112)

Like Sauter, Harrop also identifies the powerful unseen connection that binds performer to spectator. In an illustration of the mesmeric qualities of electromagnetic scientist Michael Faraday's lecturing style, this somewhat scientifically worded description of presence in performance seems appropriately apt and offers a credible articulation of what Tyndall appeared to feel in response to Faraday's lecture. His use of the term 'glowed' has connotations of light, life and vitality and chimes with Harrop's notion of a radiating force that transforms the performer's lightning power and energy. Craig's application of the word 'glitter' to describe what happened to the appearance of Irving's head suggests something spiritual, a tangible outward physical manifestation of the actor's inner energy. Irving's grandson, Laurence, offers further evidence of some kind of internal magnetic force at work:

> [H]e knew that within him smouldered the lighting of animal magnetism which, leaping the gap in the proscenium, sent its vital current through the audience, until, returning to its dynamic source, it held actor and audience in the grip of its mystical circuit.
>
> (Irving 1951: 39)

Again, this choice of language has strong electrical overtones suggesting that a powerful element of presence is tightly tied to this energetic force. As with theatrical performance then, notions of presence in the presentation techniques of these early science communicators seem inescapably connected to forces of energy and vigour. Romantic poet Samuel Taylor Coleridge, a friend and ardent admirer of Davy and frequenter of his RI lectures, highlighting the power of Davy's oratorical prowess claimed that one reason for his attendance was to 'renew my stock of metaphors' (Hartley 1966: 45), suggested, 'there is an energy, an elasticity in his mind (…) Every subject in Davy's mind has the principle of vitality' (Thomas 1991: 7). As described (2.2.2), scholars have observed how Davy's physicality and attractive appearance contributed to an overall powerful effect on audiences (Thomas 1991; Hartley 1966; Becker 1874; Paris 1831), his *presence*. Jan Golinski describes how both male and female spectators 'found themselves seduced by his mode of delivery, and captivated by the forceful presentation of his personality (…) His carefully cultivated oratorical talents and attractive personal appearance were mobilized to produce this effect' (Golinski 1992: 194), suggesting that there was conscious and deliberate intent.

Faraday was similarly interested in the effects that the physical performance of the lecturer might have on an audience. In his June 1813 letters to his friend Abbott he acknowledges that the lecturer has a difficult task in judging the appropriate physical action required (neither too much nor too little), declaring that he 'must by all means appear as a body distinct and separate from the things around him and must have some motion apart from that which they possess' (James 1991: 60). His observations suggest an awareness of how physicality might impact on an audience and enhance, rather than detract from, the presenter's craft. Clearly articulated in these examples is the notion that performer/lecturer presence is intrinsically connected to the effect on the audience and there exists a deliberate intention on the part of the presenter to create a specific desired effect. The 'audience' or 'we' are a central element in each of the above descriptions of what the scientist-lecturer or actor does. US playwright and theatre director Robert Cohen suggests that audiences are far more willing than the performers themselves to discuss the concept of presence:

> [A] performer has presence if and when she is "convincing," "commanding," "captivating," or 'charming." In each of these cases, however, the audience is describing not the actor but themselves: they are saying, in effect: "I was convinced," "I was commanded," "I was captivated." They are saying that the actor made them have an experience.
>
> (Cohen 2013: 219)

He goes on to observe that this notion of providing the audience with an experience is 'the entire goal of theatricality in the first place'. This goal, as has been shown in the aforementioned observations concerning Faraday's planning and intentions, is equally true of the lecture-demonstrations of the nineteenth century and of SMG performed explaining in 2016, as will be shown. Cohen's association of theatrical experience with being 'captivating' or 'commanding' can also be seen as having connotations of altering the spectator's perceptions. In such a way a connection can be established between the concept of a performer's presence and the altering, or transformative effect it can have on the spectator. If this was so amongst the nineteenth-century scientist-lecturer examples, it can also be said to be the case for the contemporary SMG Explainer. Charles Taylor (1988) considers this effect and focuses on the live element of the moment:

> [T]he interplay between the lecturer and the audience has a powerful effect. The presentation can be modified to take account of the audience response and there is an immediacy and excitement that conveys itself to the audience.
>
> (Taylor 1988: 6)

The examples in this section illustrate how the nineteenth-century RI lecture-demonstration mode can be thought of as theatrical event: a shared experience is temporarily established between the performer/scientist-demonstrator and the spectator; the interaction between them can be understood as generating a personal, sensorial response; the moment is consciously constructed and includes certain elements, such as oratorical skill and demonstrations, that are designed to separate it from the everyday and to impact on the spectator in some way; the entire performance represents the production of knowledge and stands for a symbol of whichever scientific concepts are being explored. In addition, I have used these examples to extend discussion of altering spectator perceptions, a concept crucial to the proposed definition of SMG performed explaining, in order to further augment the suggested connection between nineteenth-century lecture demonstration and the contemporary Explainer role.

It is useful now to consider the ways in which the nineteenth-century RI practitioners approached the task of preparing themselves for performance in order to achieve their desired impacts. In the next section I explore their work broadly in relation to techniques of training for performance.

2.5 Perspectives on training for performance

Davy, Faraday and Tyndall were highly conscious of the need to be skilled and prepared as presenters and they each honed their craft through careful rehearsal. Michael Faraday in particular was noted for his warmth in delivery and for establishing an easy, familiar atmosphere during his lectures. Science historian Michael Alley observes that Faraday was driven by the desire to ensure that every member of the audience understood his lecture content, his goal was to provide the most accessible experience: 'His eye contact, his humbleness, his passion for having the audience understand him – these served to make connections with his audiences' (Alley 2003: 17). Indeed, Faraday reportedly claimed that 'delivery or the man' (Alley 2003: 165) in an acute demonstration of his understanding that an audience will only be engaged if the presenter takes the trouble to be engaging. His comprehension that lay audiences required their path towards scientific understanding to be 'strewed with flowers' (Faraday and Bragg 1974: 6) highlights his efforts to prettify complex ideas with the intention of keeping audience needs at the forefront of his presentation. Further compelling evidence on this subject comes from other examples of Faraday's own writing on the art of lecturing:

> His whole behaviour should evince a respect for his audience, and he should in no case forget that he is in their presence (…) he should never, if possible, turn his back to them, but should give them full reason to believe that all his powers have been exerted for their pleasure and instruction.
>
> (James 1991: 61)

Faraday's preoccupation with providing the audience with an experience reveals a careful attention to the detail of planning and preparation and also of the desire to affect spectators on an almost personal, individual level, to facilitate transformation in some way. As noted he described his thoughts concerning the qualities he regarded as necessary for an effective lecturer in a sequence of four letters to his friend Benjamin Abbott in June 1813 (and numerously cited above). At times Faraday writes with very close theatrical parallels, initially concentrating on physical and practical elements such as space, lighting, entrances and exits, and apparatus, and by the third letter he has become preoccupied with the mode of delivery employed by the lecturer. He writes of the importance of clarity in expression; a regular pace that will hold the interest of the spectator; the need for physical movement and motion to avoid stiffness and provide visual variety; continuity of and focus on a consistent theme or message. Faraday offers the analogy of a tree's 'progression from roots to a trunk, to branches, twigs, and leaves' (Faraday and Bragg 1974: 9) as a way of illustrating his desire to be able to offer a complete account through his lecture-demonstrations, with a clear sense of a narrative construction of beginning, middle and end. Tyndall similarly embraced creating a form of narrative in his lecture delivery. A good example can be found in his 1871 lecture *The Forms of Water* in which his choices of vocabulary are peppered with phrases that provide a sense of a narrative journey that directly addresses the audience: 'Let us trace a river to its source (…) But we cannot end here (...) We shall learn presently (…) This is the point to which I wished to lead you (…) To complete our view of the process' (James 2007: 35-53). Tyndall also relished the opportunity to push the boundaries in terms of what could be achieved through demonstration (DeYoung 2011: 39; Thomas 1991:154) and his lectures, crammed as they were with practical experimentation, were highly physical and energetic. After attending one of Tyndall's lectures in 1862, US writer E.L. Youmans wrote to his sister describing the performance:

> He was not still a moment, but bending and twisting in all possible shapes as if he had the St Vitus dance – twisting his legs together, bending down to the desk, and working and jerking himself in all possible directions. Everybody was kept awake, entertained, and instructed. It was a work of enthusiasm.
>
> (De Young 2011: 23)

The physical energy in Tyndall's performance is unmistakeable in this description and it is easy to conjure up an image of his physical expressivity as he held his audience in thrall. Of course, some of Tyndall's triumph, as with Davy and Faraday, stemmed from the sheer drama and excitement of the experiments themselves, but other scientists of the time were also demonstrating new concepts and ideas with far less success, and thus it is clear that some conscious 'moulding' of the physical and intellectual energy of the lecturer, the construction of some form of narrative, coupled with a generous display of experiments, had an important effect on the audience.[46] An article in *The Athenaeum* (no. 3450 9 Dec 1893) praising Tyndall's lecturing capabilities also reveals his commitment to practice and preparation:

> His lectures (…) were models of method; nothing was left to chance; everything, down to the minutest detail, was prepared with nicety; and the experiments were consequently performed with the precision unequalled by the manipulation of an accomplished conjurer.
>
> (De Young 2011: 41)

In view of Tyndall's admiration for Faraday, he 'loved and revered him' (Caroe 1985: 72), he likely learnt from him the importance of being appropriately trained and prepared for performance. Indeed, Eve and Creasey's biography observes that Tyndall 'knew that a public lecture should have the same exacting care in production as a play in the theatre' (Eve and Creasey 1954: 44).

Of the three RI subjects featured here it was Michael Faraday who developed the most intense interest in self-improvement and training approaches in order to ensure optimum standards of performance. Declaring that only a poor lecturer would fall 'deeply beneath the dignity of his character when he descends so low as to angle for claps and asks for commendation' (Williams 1971: 57), he offers a clear illustration of his belief in the on-going need for humility, despite his own personal success.[47] Perhaps this intense interest in the successful elements of the craft of lecturing can be partly attributed to the less than auspicious start to his own lecturing career at the RI, for as Frank AJL James notes, citing an eyewitness

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[46] In his biography of Davy, J.A. Paris documents the demise of a Dr Young, who began lecturing at the RI in July 1801, some five months after Davy, and in a more senior position, but quickly found that his audience numbers, in contrast to Davy's diminished on a daily basis for the apparent reason that he 'adopted too severe and didactic a style' (Paris 1831: 140). Davy replaced him in July 1803.

[47] Interestingly this idea would seem to condemn the actions of Faraday's predecessor, Humphry Davy, who, as commentators (Morus 1998; Golinski 1992; Hartley 1966; Paris 1831) generally agree, was vain and frequently courted popular appeal and praise.

account from the December 7 1824 lecture, Faraday 'mainly read, was too diffident, and used too many colloquialisms' (James 2010: 92). Such a lack of initial impact is somewhat surprising since Faraday had for several years since 1813 been engaged in a sort of self-imposed peer review club formed along with his friend Edward Magrath:

> During this spring Magrath and I established the mutual self-improvement plan, and met at my rooms in the attic of the Royal Institution, or at Wood Street at his warehouse. It consisted perhaps of half-a-dozen persons, chiefly from the City Philosophical Society, who met of an evening to read together, and to criticise, correct, and improve each other's pronunciation and construction of language. The discipline was very sturdy, the remarks very plain and open, and the results most valuable.
>
> (Jones 1870: 50-1)

Morus (1998) also notes this initiative, describing too how Faraday began to take private lessons in elocution and public speaking with Benjamin Smart, a well regarded tutor who in 1819 published his own manual, *The Practice of Elocution, or a Course of Exercises for Acquiring the several Requisites of A Good Delivery*, in its third edition by 1832. Faraday's interest in all of this suggests that he recognised in his own capabilities something that was less than intuitively engaging, but that by focussing on acquiring the necessary skills and then actively training, he believed that his technique could be developed and improved. Indeed, in his letter to Abbot dated June 1st 1813 he observes how he makes judgements about the lecturing skills of others despite being 'entirely unfit for such an office himself' but that ''tis evident [he has] yet to learn' (James 1991: 55). His humble start in life and lack of formal education had fostered in him a strong desire for self-improvement (Morus 1998; Caroe 1985; Williams 1965) and his quest to better his skills as a lecturer, as well as later, to propose his own advice for the most appropriate strategies for effective lecturing, were doubtless part of his need to make his mark amongst the front ranks of science and society. Smart advocates the need for written text, here taken to be the lecture, to be delivered aloud spontaneously, with all the natural intonations and inflections as if being thought of 'unstudied' (Smart 1832: vii) and for the first time. His own prose suggests that he desired subjects should speak the written text each time with the same level of expression as they 'thought and felt' (Smart 1832: x) on first utterance, his association of emotion and feeling with effective vocal expression seemingly clear. His frustration with those who proved unable to do so is evident, as is his belief that training could provide solutions to this problem:

> It is a constant subject of regret that men whose learning, intelligence, and sensibility cannot be doubted, are habitually cold and languid in the delivery of written composition, however impassioned. What can have produced so unnatural a separation between the words and the tones of emotion, but the absence of that instruction which would have kept them united?
>
> (Smart 1832: x)

Faraday did wholeheartedly feel and believe in what he was describing. As Michael Alley notes, whilst other lecturers were focussed on simply impressing the audience with their knowledge, 'Faraday worked hard to make sure that everyone in the audience understood what he had to say' (Alley 2003: 17). From his own letters to Benjamin Abbott in 1813, it can be seen how he observes that the pace, clarity and expression of the lecturer must be pitched in order to clearly convey the appropriate right meaning to the audience, and periods of speech must be timed effectively, 'if they are long or obscure or incomplete they give rise to a degree of labour in the minds of the hearers which quickly causes lassitude indifference and even disgust' (James 1991: 60). Faraday fully believed in the knowledge he had acquired and the lecture-demonstration was the process that enabled him to share it, and his own discoveries with audiences, even if initially he needed some assistance with ensuring that those feelings were successfully conveyed.

John Tyndall appears to have encountered no such difficulties, indeed, he was sometimes criticised for his over-sentimental, mawkish, 'purple patches' (Eve and Creasey 1945: 337), but significantly his own words reveal an *instinctive* reliance on his feelings to assist his delivery. In a letter to his friend Hirst he recalls the memory of his early career as a teacher of schoolboys, while at the same time reflecting on his feelings stirred by his own delivery of a lecture in 1854, observing that during delivery he 'had the boys in the playground in my mind's eye, and spoke, I doubt not, with the feeling which my affection for the little fellows prompted' (Eve and Creasey 1945: 51).[48] The impression created here is one of unfeigned warmth towards his previous charges that transposes onto his aim to effect understanding in a pleasurable context amongst his current listeners and enables Tyndall to concentrate his delivery efforts accordingly. Tyndall has been described (De Young 2011; Thomas 1991; Ironmonger 1958) as having done more than any other to kick-start the popularisation of science, and although this is sometimes meant disparagingly, he is known for having been passionate about disseminating scientific knowledge as widely as possible. In their biography Eve and Creasey suggest that his success as a lecturer was largely due to his genuine passion and earnestness, observing that it was the way in which his words were 'charged with the essence of spirit and emotion' (Eve and Creasey 1945: 338) that impressed audiences on such a grand scale and gave meaning to his ideas, a description that echoes the earlier discussion of presence (2.4.2).

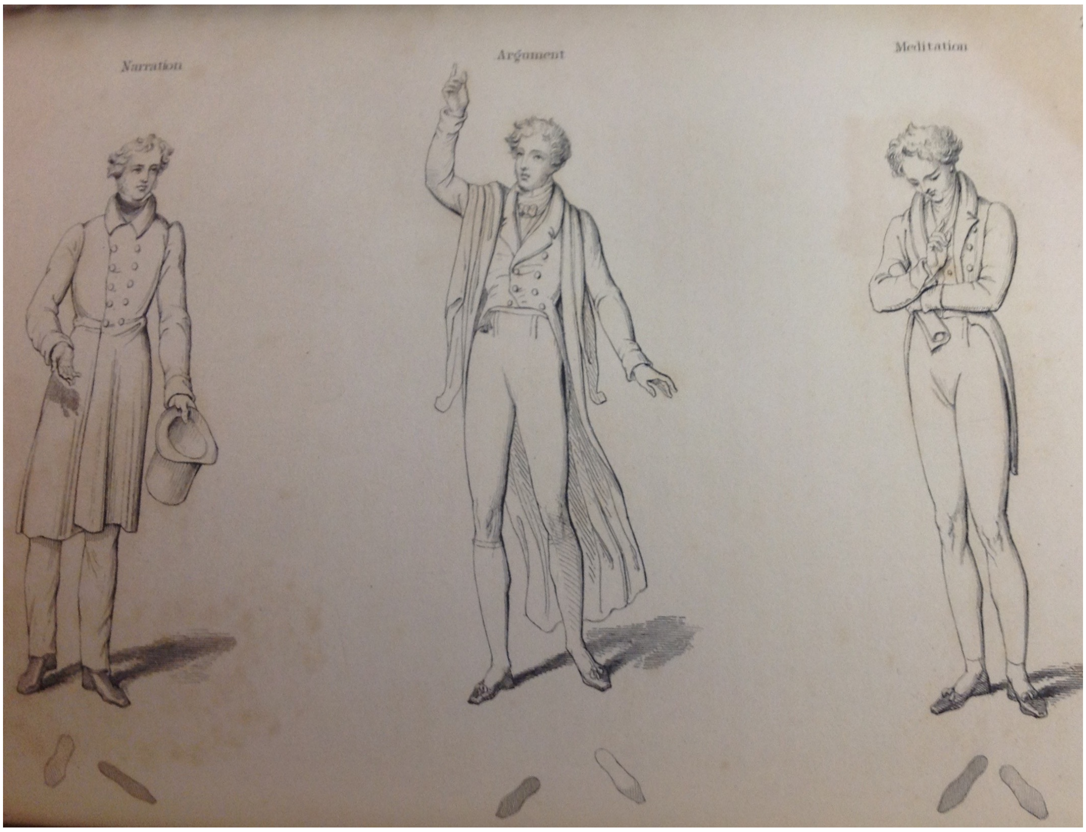
Faraday was wholly committed to the notion of training and practice and he consistently worked hard to improve his performance, even engaging strategies such as having Magrath observe his lectures and report back any faults, or hold up a card showing 'slow' or 'time' (James 2002b: 227) to assist him with keeping pace. James (2002b) notes how Faraday also recruited his assistant Charles Anderson to monitor his performance and ensure that he kept to his own self-imposed standards. These practices, as we shall see, call to mind the approaches currently adopted by SMG Explainer teams, and discussed in Chapter 5 (5.5.1), where peer-to-peer review and feedback is a frequently used strategy for learning and development.

James notes that Faraday's chief aim with the lecture-demonstrations was to 'make science a polite entertainment requiring the sort of suspension of disbelief that is associated with the theatre' (James 2002b: 227) and his method of drawing audiences in through his use of Smart's techniques of 'Impassioned Speaking' (Smart 1832) was central to this. Smart advocated a continuing approach to training, believing that the work was never complete. In common with the western

[48] This has connotations of 'emotion memory', the actor training technique attributed to Constantin Stanislavski (1993: 163-192). It could be suggested that in this moment Tyndall instinctively recalled memories of his actual past feelings in order to inspire and augment his present delivery.

approach of ‘indirect training’ (see footnote 25) that focuses on the development of skills specific to each new form or production, Smart addressed voice and body as equal components in the quest for effective expression and audience engagement, claiming that ‘the looks, the gesture, the whole deportment of the speaker, lend assistance, and it is the union of all these that constitutes expression’ (Smart 1832: 63). The graded exercises and suggestions for physical stance and gesture in Smart’s manual are complex and highly detailed, focussing on minutiae such as the positioning of the feet, with ‘toes moderately turned out’ (Smart 1832:91), distribution of the body weight and comfortable placing of the arms and hands. Once the subject is in the correct position the goal is to ‘let the Speaker carry his eyes gently round, addressing a real or imaginary audience, till the situation feels no longer awkward’ (Smart 1832: 91), the emphasis on supposed natural and spontaneous action is clear. Again, this offers a parallel with contemporary SMG Explainer training practice where participants are taught to use the *Lighthouse Technique* (NMSI Learning 2010: 8), a method requiring the Explainer to sweep their gaze across the assembled audience, as the beam of a lighthouse does across the sea, moving their face and body accordingly so that they draw in the whole of the audience and not just those immediately in front of them. The technique is associated with making effective individual eye contact with as many spectators as possible in order to try and establish a connection with them that enhances an atmosphere that is natural and genuine. The specific ways in which this technique is approached may have changed in the almost two hundred years since Smart was writing, but it can be seen that the overriding ambition in this instance was the same for Faraday as it is for the contemporary SMG Explainer.

Smart’s manual also includes illustrations of various modes of speaking and Faraday would likely have appeared thus during his performances:



(*Figure 2.2*) From *The Practice of Elocution, or a Course of Exercises for Acquiring the several Requisites of A Good Delivery* p.91.

Indeed, comparison with an extant representation of Faraday in performance mode from 1855 (*Figure 2.3*) below, shows that his physicality bears strong resemblance to Smart's 'argument' mode in particular, shown in the middle (*Figure 2.2*) above:

(*Figure 2.3*) Alexander Blaikley's 1855 lithograph of Michael Faraday delivering a Christmas Lecture in the theatre of the RI. © Royal Institution.

The concept of training in order to appear natural and spontaneous is central to a variety of performer training methods, such as the 'System' of Constantin Stanislavski (1863-1938), and the improvisational techniques of Viola Spolin (1906-1994) amongst others. Faraday seems to have been intuitively exploring how training his vocal and physical qualities in order to effect audience immersion, and in this sense can be seen as somewhat ahead of his time. His success in performance suggests that his training for naturalness was apparently wholly effective, his friend Bence Jones observing that 'his manner was so natural, that the thought of any art in his lecturing never occurred to anyone' (Morus 1998: 29).

Faraday's mentor and predecessor, Humphry Davy, was similarly concerned with the *appearance* of naturalness, carefully rehearsing with his assistant to ensure the desired emphasis and intonation of his delivery, 'often repeating a passage two or three times, to witness the different effect of variations in his voice. His manner was perfectly natural, animated and energetic, but not in the least theatrical' (Davy 1836: 250) and he developed a reputation for imaginative, poetic oratory blended with vibrant and exciting demonstration. Hartley's biography describes how he rehearsed every lecture very intensively to ‘ ensure that the experiments ran smoothly and to practice the emphasis and intonation of his delivery’ (Hartley 1966: 45). John Tyndall was likewise preoccupied with providing his audiences with entertaining and spectacular performances that gave the impression of the impromptu. As science historian J.D. Burchfield notes in his examination of Tyndall at the RI:

> Tyndall’s sense of showmanship, his gift for devising visually striking experiments, and his ear for the tempo of his words were his own, and he laboured to refine each in minute detail (…) Experiments were rehearsed, timed and integrated into the text so that the lectures would flow with the ease, and often the drama, of apparent spontaneity.
>
> (Burchfield 2010: 155)

A further example of Tyndall’s desire to recreate an atmosphere of spontaneity can be found in an anecdote concerning how he once accidentally knocked a flask off the desk whilst preparing for a lecture. His quick response enabled him to catch it before it shattered on the ground and apparently impressed by the effect he then proceeded to rehearse the ‘accident’ and later included it in his lecture (Lightman 2007: 177). Charles Taylor describes a similar event (1988:99) in which Tyndall was spotted practising vaulting over the demonstration bench at the RI over and over again, so that in performance the need for him to make a swift arrival at the front in order to prevent an ‘accident’ from occurring could happen smoothly and ‘naturally’. The idea of a rehearsal of an ‘accident’ in order to make it appear natural but to heighten the theatrical effect for the audience at the same time is one reason for Tyndall’s reputation for ‘showmanship’, but also highlights the spectacle involved in these practices. In addition, it reinforces the *artistic* element identified by Sauter (2000) as a necessary component for theatrical event, further emphasising a reading of these nineteenth-century lecture-demonstration practices in this way.

There are other significant ways in which the rehearsal approaches adopted by some of the RI practitioners can be understood as theatrical. In his book *The Art and Science of Lecture Demonstration* (1988) Charles Taylor helpfully describes his own interpretation of the lecture-demonstration form:

> A good demonstration lecture is a dramatic performance and there is no doubt that the lecturer must be at least a performer, if not an actor, in order to put over a demonstration lecture effectively.
>
> (Taylor 1988: 55)

Taylor's summary here privileges the performance element over content (although it is noted that he later suggests that entertainment, while important, should always be secondary to the main function of conveying scientific principles) and this recognition of the lecture-demonstration as 'dramatic performance' must then, result in preparing for it as such. The apparatus used to present the demonstrations becomes akin to theatrical props and the lecturer must be suitably familiar with it in order to utilise it in a safe but dexterous way. For practitioners at the RI the equipment used in the performances of lecture-demonstrations also served as the tools of their trade and they would be used to working with it in the privacy of the laboratory as well as in the public forum of the lecture theatre. Nevertheless, the presence of a live audience brings with it the possibility of unpredictable reactions and in the same way that dramatic companies would rehearse with tangible props as early in the process as possible, so too would a scientist in the run-up to lecture-demonstration (Taylor 1988: 102). Taylor is helpful in offering a further first-hand insight into the preparation approaches common at the RI, discussing this in terms of 'blocking' the movement within the space, and describing conducting a 'technical rehearsal' shortly before the actual performance. Additionally, he refers to the use of a 'script' and a clear 'running order' of the demonstrations to be performed. The roots of these practices can be found in the approaches taken by the three RI subjects featured here and all three produced carefully handwritten 'scripts' in advance of their presentations, various accounts confirming that they rehearsed these either alone or in the company of others for responses and advice (De Young 2011; Burchfield 2010; Alley 2003; Thomas 1991; Taylor 1988; Siegfried and Dott 1980; Hartley 1966; Eve and Creasey 1945). At least two accounts (Taylor 1988; Siegfried and Dott 1980) refer to the inclusion of meticulous notes accompanying the script, serving the same function as stage directions. In these ways there is an extension of notions of intertheatricality at play: the practices successfully adopted by various theatrical performance forms have seeped into the culture of preparation for non-dramatic, but performance modes of scientific lecture-demonstration. These nineteenth-century attempts to inspire wonder and delight amongst audiences are consistent with the efforts of the contemporary SMG Explainer, as explored in Chapter 5 (5.3.1), and the associated extensive rehearsal and training processes of the nineteenth-century can also be seen as having parity with methods used in the current context.

2.6 Conclusion

This chapter has provided a context for the consideration of nineteenth-century lecture-demonstration practices at the RI from a performance-focussed perspective. It has argued for an understanding of these practices in parallel with performer training notions of vertical transmission, with the interconnecting of the concepts of intertheatricality and embodied knowledge transfer practices enabling their on-going reiteration in subsequent generations. The chapter has also suggested how these practices can be understood as theatrical event and has explored some of the associated training and rehearsal processes in the context of theatrical performance parallels. The dominant context has been the RI, and the chapter has also offered a broad summary of its foundation and nineteenth-century approach.

In the first part of this chapter I have analysed the relationship between the three chosen men of science Davy, Faraday and Tyndall in terms of the performer training concept of vertical transmission, suggesting that embodied practices were passed on through naturally occurring training routes at the RI and diffused amongst subsequent generations. In particular I have emphasised the importance of physical presence (Taylor: 2003) and observation to this transmission. Considering, and also extending, Bratton's single time-frame notion of intertheatricality I have suggested that the experiential memory of individual spectatorship over time, for instance the RI lecturers observing each other's practice, when considered alongside notions of restored behaviour (Schechner: 2006) and repertoire (Taylor: 2003) becomes a sort of intergenerational embodied practice that transcends the confines of the RI. In so doing, I propose a framework that merges three interpretations of intertheatricality (Bratton 2003; West 2013; Bloom et al 2013), capitalising on Bloom et al's intimation that temporal constraints may be exploded, to suggest a vertically occurring transmission of embodied practices. The performance modes evident in the nineteenth century at the RI have thus been absorbed and reiterated in each subsequent generation of RI practitioners and then, as the next chapter illustrates, move beyond, post-1954, to ScM. I have discussed the nineteenth-century lecture-demonstration practices of the RI in terms of Taylor's 'archive and repertoire' (2003) in order to suggest that contemporary performed explaining can be regarded as a form of living archive of past practices, traces of the past reiterating in continuous embodied revisions.

As a secondary performance-focussed element (research question 2 (1.1.3)), this chapter has also considered how Wilmer Sauter's (2000) definition of theatrical event can augment an understanding of RI nineteenth-century lecture-demonstration as performance practice. Building in particular on Sauter's notion of the sensory, the chapter has explored what might be understood as the performer-presence of the RI scientist-lecturer, and the impact this might have on the spectator. Developing performance-focused interpretations of lecture-demonstration practices the chapter has illustrated how certain training and rehearsal approaches enabled Davy, Faraday and Tyndall, in varying degrees, to consciously recreate conditions that appeared natural and spontaneous to the audience, highlighting at times, the similarities between these approaches and those of the SMG Explainers in the contemporary context.

In the next chapter I explore live-person interpretation practices at ScM in the first part of the twentieth century. I propose that intertheatrical processes residing in the memories and experience of ScM Guide Lecturers influenced their own practices in a 'mesh of connections between all kinds of [presentation] texts, and between texts and their users' (Bratton 2003: 37-8) following their 1954 observations of RI scientist-lecturer Lawrence Bragg.

Chapter 3

Explaining the Collections: the development of ScM Lecture Service 1909 – c.1980

3. Introduction

In the previous chapter I focussed attention on particular RI nineteenth-century lecture-demonstration practices that I propose can be regarded as forming the roots of a lineage extending to the contemporary SMG Explainer role. This chapter shifts the focus to ScM and presents a much-needed exploration of the contribution to live-person interpretation there made by the members of staff known as Guide Lecturers, their first appearance being precisely dated to April 1924 (Follet 1978: 103). As with the previous chapter there is a distinctly historical emphasis, although here ideas are structured around a range of published and unpublished archival sources from ScM's own Documentation Centre, most notably the Z Archive.[49] The lack of formal organisation or cataloguing of the Z Archive contents, noted in (1.2.2), sometimes raised problems concerning the ease of locating materials, and indeed, a lack of certainty regarding what is actually contained in the archive. More crucially, this haphazard approach points to an under-valuing of the contribution made to the development of ScM by a variety of public-facing educational roles. This attitude is also supported by the lack of photographic evidence pertaining to the variety of roles I have identified in the lineage.[50] It appears that the extant materials relating to these roles have survived thanks largely to the instinctive hunches of past curators that they may one day be of interest, rather than out of any serious consideration of their value in augmenting the Museum's history. Nevertheless, the Z Archive proved an invaluable resource

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[49] The Z Archive houses a wealth of material relating to object acquisitions, Annual and Advisory Committee Reports, policy and project files as well as personal correspondence between staff members and external bodies, committee meeting minutes, memoranda, staff bulletins and similar operational documentation often with a focus on the educational function and purpose of ScM/SMG.

[50] A comprehensive search conducted with the assistance of picture research staff at Blythe House yielded a relatively small number of images of Guide Lecturers at work during the mid-1950s-70s, and even fewer from the period before this. Images of the roles relating to the period 1980-2000 were limited to a small number of slides.

for my investigation and while not limited to the following sources from within it, the range of materials scrutinised for this chapter is centred around:

- ScM guidebooks and education brochures c.1870-1977
- a selection of ScM Advisory Council Reports 1946-83
- a selection of ScM Annual Reports 1952-80
- Lecture Service correspondence and planning materials from 1952-83
- Schoolteachers' Conference Report 1954
- Children's Interests Committee meeting minutes 1951-58
- ScM *Bulletin* 1955-60
- various internal memoranda[51]

Evidence for this chapter has also been gathered through the living memories and reminiscences of former and current ScM employees, obtained during face-to-face informal interviews, online questionnaires and email correspondence (see 1.2.1).

3.1.1. Chapter rationale

There are two fundamental elements to this chapter. Using the available archival evidence it presents, for the first time, a historically organised interpretation of the foundation and development of the Guide Lecturer role, as well as providing insight into the development of ScM's Lecture, and then later re-named, Education Service. An element of this investigation assesses the contribution and influence of the Guide Lecturers on the wider cultural development of ScM and, where possible and useful, I examine their live interpretative work through the lens of performance.

The second important function of this chapter is to illustrate how the development of the Guide Lecturer role can be regarded as having been explicitly influenced by the presentational styles and methods of RI lecture-demonstration scientists. Considering the impact of theoretical frameworks of vertical transmission and embodied knowledge transfer practices, and to a lesser extent intertheatricality, I explore the ways in which RI practices can be seen as being 'restored' or 'recycled' in ScM Guide Lecturer approaches. Additionally, the chapter suggests how this role

[51] A full list of archival sources is presented in the bibliography.

can be viewed as a critical stage in the evolution of the current SMG Explainer role, providing its ScM roots, which in turn, I suggest, are bound to past RI practices. Broadly speaking then, the chapter can be seen as having two distinct sections - the first, and larger part is historical, the second, theoretical.

In terms of the historiographical methodology this chapter actively pursues the first four of theatre historian Thomas Postlewait's applications and processes of historical enquiry as illustrated here in Chapter 1 (1.2.2) and reiterated here:

1. Events that actually happened in the past
2. Existing records for events that happened in the past
3. The act of investigating these records
4. The final account provided by the historian or researcher

(Postlewait 2009: 3)

As a consequence of the lack of significant archival evidence relating to the Guide Lecturer role, particularly from its inception and earliest years, I take an approach to periodisation that identifies three phases and a key moment in its history. These are broadly defined as follows:

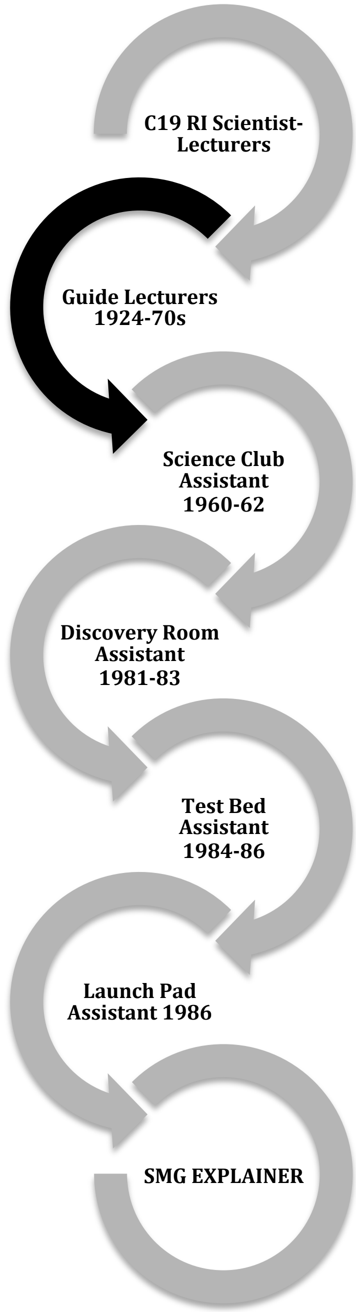
- 1924 – 1930: encompasses the introduction and early expansion of the role, including the move from one to two posts
- 1951 - 1959: incorporates the key moment in 1954 where Guide Lecturers attended RI lecture(s) with a view to emulating them. This moment is of critical importance to one of the central arguments of the thesis and is explored in detail in the chapter; the phase also encompasses a period of growth and expansion in the scope of their work
- 1960 – 1980: sees the shift towards a larger Education Service and the gradual decline of formal lectures in favour of a more participatory approach[52]

For the purpose of context setting also included is a brief section depicting relevant events in the period 1909-24. The core focus of the investigation in this chapter is on the period from 1952 onwards when archival records were more

[52] Chapter 4 explores the development towards interactive, hands-on learning.

plentiful. Where possible I use a combination of the limited available published material relating to the Guide Lecturers, largely restricted to Follet's 1978 account of ScM under the Directorship of Henry Lyons in the years 1920-33, alongside sparse references found amongst other documents held in the Z Archive. Since my inquiry interrogates live events and practices that occurred in the past, most of which were not recorded or documented in any detailed way, if at all, in accordance with contemporary historiographical approaches (Schneider 2014; Mangan 2013; Davis et al 2011; Postlewait 2009; Zarilli et al 2007; Bratton 2003; Steedman 1998) it is sometimes necessary to suggest speculative explanations and interpretations rooted in the existing evidence. To briefly reiterate these, in (1.2.2.) I explained my historiographical research methodology, noting how contemporary practice acknowledges that history is not the product of one single account but instead 'something in which the certainties of cause and effect are replaced by multiple stories with unexpected gaps, leaps, flashbacks and repetitions, which interweave in unpredictable ways' (Mangan 2013: 84). This chapter therefore makes imaginative use of the available sources (Steedman 1998) in order to reconstruct elements from Guide Lecturer practices, and to propose one possible version of a trajectory that ties this earlier role to that of the contemporary SMG Explainer.

Reprising the diagrammatic representation of the Explainer lineage first presented in Chapter 1, the element explored in this chapter can be thus illustrated:



(*Figure 3.1*) Representation of chapter contribution to the Explainer role lineage

The chapter will broadly address the first principal research problem:

- What are the origins of current performed explaining in the SMG and what traces are evident from the practices of science lecture-demonstration in the nineteenth and early twentieth centuries?

In addition it addresses all four of the subsidiary research questions in varying degrees, but particularly examines questions 1, 2 and 3:

1. What does a focused analysis of the role of the Explainer and its antecedents reveal about the historical and cultural development of the SMG?
2. What are the shifting attitudes of the museum industry to the role of the Explainer and its antecedents in the period?
3. How do conceptions of expertise, value and status play out in this sphere?

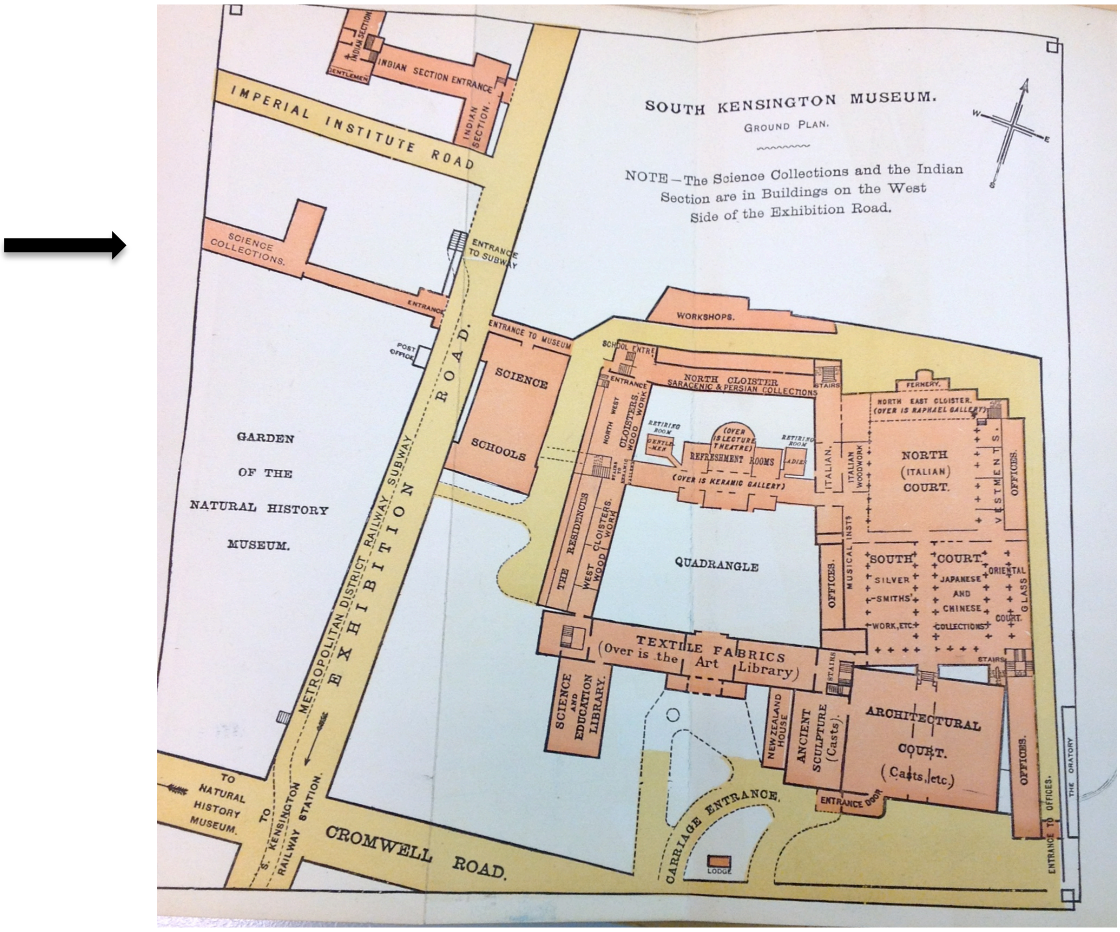
This thesis does not seek to present a detailed account of the history of ScM. A brief selective summary is, however, fundamental to revealing the context of the founding and advancement of its live performed interpretative approach. The next section therefore provides such contextualisation.

3.2 ScM: a step towards live interpretation (1909-1924)

The nascent years of ScM are relatively well documented (Bud 2010; Follett 1978; Morrison-Scott 1957; Greenaway 1951) although as Peter J. T. Morris, writing in 2010 as the editor of a publication marking the centenary of ScM, *Science for the Nation*, and himself then its Principal Curator of Science, notes in his introduction that these stories are mostly re-told by some of its past Directors and current or former employees, in accounts that have frequently been published to coincide with the marking of other milestone anniversaries. There can therefore often be detected a triumphant and celebratory tone to the narratives – the image constructed is one of an institution that is 'more than just a museum; a space [that has] become a powerful cultural force and one of the state's major concerns' (Morris 2010: 4). These stories tell the tale of the growth and expansion of an organisation that has claimed this place by defining itself as a satisfied and successful collaboration of perspectives on science that explore both the historical and the contemporary. As noted in Chapter 1 (1.1.1/1.1.2) this thesis attempts to redress the balance through the presentation of a version of its history and current practices from the more unusual perspectives of lower-ranking roles.

ScM's comparatively modest beginnings can be traced to 1857 when, partly driven by Prince Albert's celebrated vision for educational reform promoting learning amongst the general populace, science and technology objects were gathered to form one element of broad collections under the title of the South Kensington

Museum. This Museum was itself established to house objects derived from a variety of sources, including many from the Great Exhibition of 1851 (Follett 1978: 12) alongside models of both patented and unpatented machines and other historical machinery (Bud 2010: 15). During the 1860s the science collections were transferred from the main, vast and newly constructed museum buildings on the east side of Exhibition Road, to be contained within several smaller arcades that had previously been used for temporary exhibitions over on the west side. An early ground plan of the South Kensington Museum clearly illustrates this imbalance of dedicated floor space and highlights the physical marginalisation of the science collections away from the decorative and plastic arts and design collections (*Figure 3.2*).



(*Figure 3.2*) Ground plan of the South Kensington Museum with arrow showing location of science collections in smaller buildings on the west side of Exhibition Road.

In 1909 a formalising of the permanence of this separation saw the establishment of two of the most prominent museums in London: ScM and the Victoria and Albert Museum (V&A). Robert Bud has described this development as 'the failure of the vision behind the integrated South Kensington Museum' (2010:14), pointing out that ScM has sometimes suffered from an unflattering portrayal as the remnants left behind by the transformation of the South Kensington Museum into the V&A. Nevertheless, in its earliest days the science collections continued to expand, albeit essentially through unexpected additions and donations rather than through any ordered or consistent strategic planning (Morrison-Scott 1957:3). In 1876 however, an exhibition of the Special Loan Collection of Scientific Apparatus, officially opened by Queen Victoria, heralded a new interest in more actively developing and consciously curating the science collections. In addition, the exhibition evidenced a growing interest, driven by the aspirations of Henry Cole, a high-ranking Civil Servant who had been the first Director of the South Kensington Museum, to present objects in such a way so as to highlight the practical application of science to industry (Bud 2010: 19). Thus there existed an early interest in fostering understanding of the impact of science and technology on daily life, an aim that also chimes with the fundamental objectives of the RI, present since its inception. Present day approaches at ScM also appear little changed - its current mission is to 'make sense of the science which shapes our lives' (Science Museum Group 2012:2) the interest in assessing its contribution to real life clearly still in evidence. Tony Bennett's (1995) critique of the development of the public museum documents more broadly the shift in exhibition priorities from that which was 'concerned to create surprise or provoke wonder' to that which was 'calculated to make intelligible a scientific view of the world' (Bennett 1995: 2). Citing Nicholas Pearson's study *The state and museums of art* (1982), Bennett highlights governmental approaches made in the second half of the nineteenth century towards the promotion of art and culture, and indeed, also illustrated in Cole's underlying ambition. Identifying two distinct methods of approach, 'hard' and 'soft', institutions such as the museum relied heavily on the latter in their efforts towards the advancement of public understanding and enlightenment (Bennett 1995: 87). This 'soft' approach involved the participant's voluntary engagement in self-improvement and learning using methods that relied primarily on entertainment, encouragement and subtle coercion.[53] As is shown later in this chapter progressive leadership at ScM from the early 1920s sought to

[53] As opposed to the 'hard' approach where a 'systematic body of knowledge and skills was promulgated in a systematic way to specified audiences' (Bennett 195: 87), usually through the constrained and often punitive methods of the school system of the time.

embrace this attitude and aimed for what was, in its time, an enlightened approach towards the dissemination of knowledge, with recognition of the powerful, transformational effect this might have on audiences in terms of their learning and understanding.

From the outset ScM was closely aligned with the government, initially coming under the jurisdiction of the Department of Science and Art, and later the Board of Education, and still today remains heavily dependent on state funding from DCMS (see 1.3). The task of identifying a suitable solution to the issue of permanent accommodation for the newly established ScM fell to the Board of Education, and in 1910 it appointed Sir Hugh Bell, a prominent steel industrialist, as Chairman of the Museum's Advisory Council. The subsequent and highly influential Bell Report of 1911-12 considered the issues surrounding the existing condition and future development of the collections and their residence, and was significant in arguing for progression in the work towards physical improvements and the construction of new buildings.[54] Indeed, various accounts of ScM's history are predominantly focussed on this specific contribution made by the Bell Report (Bud 2010:33; Morrison-Scott 1957: 7) but there is a further element of the Report that is of greater interest to this research. The Bell Committee perceived the need for a means of ameliorated provision towards enhancing visitors' enjoyment and understanding of the objects, a perception that is best illustrated by its recommendations regarding the introduction of 'public demonstrations in the galleries by suitably qualified lecturers or guides' (Follett 1978: 26). Significantly, the Report notes that the practice of presenting 'public demonstrations at set times in the galleries by lecturers or guides acquainted with parts of the collections and able to give suitable exposition of the points the objects are intended to illustrate' (Follett 1978: 103) had already been established at some other museums, and in this respect ScM seems to have fallen behind contemporaneous practice. The recommendation, with its resonances of 'soft' approaches towards public education, is included in a longer list of possibilities for improvement in a section entitled *Methods of Promoting the Various Uses of the Museum.* This list largely

[54] The Bell Report was published in three phases: a Preliminary Report in 1910 (just four months after the Committee were appointed); Part 1 in March 1911 (which includes the sections relevant to this research); and Part 2 (largely concentrated on buildings) in April 1912.

concentrates on infrastructure and buildings provision such as the need for a conference room and separate lecture theatre so that relations with external scientific societies and groups, as well as the general public, could be established – evidence of an early desire to engage with local communities and audiences. Notable is Follett's conclusion that the 'most important, and in the event the most fruitful recommendation' (Follett 1978:26) made in this particular section related to approaches to the occasional exhibition of the temporary collections and the suggestion that this should be done alongside developments in contemporaneous industries in order to highlight the currency of the objects. The Bell Report may have demonstrated some commitment to the notion of improving the experience for the visitor, but its real focus on buildings and exhibition further highlights the lack of any enduring interest and ambition in relation to person-based interpretation.

Nevertheless, the 1911 recommendation is of critical interest to this research as it offers perhaps the earliest suggestion that not only might actual persons enhance the visitor experience at ScM through verbal communication and demonstration, but also that that which is now understood as 'live interpretation' should occur amongst and within the collections, rather than somewhat side-lined in a lecture theatre or other liminal space. In any event, the Report concluded that demonstrations 'should be tried in some form or other' (Follett 1978: 103) at a point in the Museum's future. Acknowledging the value of the existing spatial provision, the Report commended the classroom spaces, where teachers were able to make use of museum objects to supplement and enhance their own teaching practice (Follett 1978: 26), but in identifying the potential use of guides or lecturers presumably also anticipated the need for greater Museum intervention. Tim Boon's chapter contribution to the centenary publication *Science for the Nation* (2010: 115) also notes the overall influence of the Bell Report on the establishment of an approach to object interpretation that looked beyond the label. It is noted too that as early as 1876 the usefulness of the live spoken word as adding value to object interpretation was explored in a series of 'first-rate lectures' (Bud 2010: 19) staged to accompany the exhibition of the Special Loan Collection of Scientific Apparatus, when it was still the South Kensington Museum. The location of these lectures remains unclear and it is a matter of conjecture as to whether they were held amongst the displays of scientific apparatus or in some other space. In spite of the Report's recognition that the galleries themselves would provide the best and most suitable location for public demonstrations and guided tours, the Report conceded that their 'congested' (Follett 1978: 103) state at the time of writing would make this unfeasible – future gallery design would instead have to make provision for this.

The prospect of staff available to assist members of the public within the galleries certainly was embraced by the progressive regime introduced under Henry Lyons' Directorship. In his account *The Rise of the Science Museum under Henry Lyons* (1978) David Follett, himself Director of ScM from 1960-73, observes how, in the early 1930s, 'of the lower grades all but a few, who gave general assistance to the Leads of Divisions (…) were expected to spend as much time as possible in the galleries, to be on hand to answer enquiries from visitors' (Follett 1978: 58). These untrained uniformed personnel, known as Museum Attendants, were distinguished from the Wardens, who had more of a safekeeping or protective role, by the absence of a cap, and the adoption of frock coats on Sundays, instead of the ordinary jackets they wore on weekdays. Although considered marginally further up the employee grade, it appears that neither the Warden nor Attendant role carried any particular status within wider Museum structures, and as is debated later in this chapter (3.3.2) and elsewhere in this thesis, this lack of status afforded to those with a public engagement brief is revealing considering the potential for impact and reputation that this type of public-facing role can potentially hold. Nevertheless, the Attendants did not adequately fulfil the role envisaged in the Bell Report for a more instructive presence in the galleries and it was to be some time after its 1911 publication that this finally occurred.

3.3 Guide Lecturers: introduction and expansion (1924-1930)

Colonel Sir Henry Lyons became the Museum's Director in 1920 having previously served as Secretary to the Advisory Council, and effectively as Deputy Director to Frances Grant Ogilvie.[55] Forward thinking and ambitious, Lyons is credited with

[55] Ogilvie was Director of ScM from 1911-1920.

bringing 'to fruition one of the great achievements of "Progressive Era" Britain and of the "promotion of science"' (Bud 2010: 36), successfully finding methods of highlighting and presenting both pure science and its application to industrial and domestic practice, and in so doing, building on the foundations laid by Henry Cole at the South Kensington Museum. But he also made a broad and important contribution to steering the direction of ScM towards a more inclusive establishment, beginning the process in 1922 when he set out to transform approaches to the display and labelling of objects with a view to making them more accessible to the 'ordinary visitor'. Often assuming pre-existing technical or contextual knowledge, and indeed, the ability to read, object labels were frequently overly lengthy and densely worded, referring to people and places far beyond the experience of many visitors. Interpretive writing, typically the purview of curators, tended to reflect their knowledge and expertise but at the same time exemplified their lack of skill in understanding how this should be communicated to a non-expert public. Lyons was particularly concerned with how this knowledge held within the Museum's collections and embodied by those responsible for their curation should be disseminated amongst and shared with *all* audiences. Contradicting practice and opinion of the time, and seemingly attempting to adopt a 'softer' approach than had previously been employed, Lyons identified the needs of the 'ordinary visitor' as the top priority ahead of the 'technical' and 'specialist visitor' (Follett: 1978: 98) long held as ScM's real intended audiences. In so doing he effectively challenged a cultural power dynamic that had previously left the general public to their own devices, demonstrating instead, an interest in offering them the 'opportunity to civilize themselves' (Bennett 1995: 47). It is noted however, that it was 'many years before the museum world generally accepted that museums were as much for the "ordinary visitor" as for those already knowledgeable in their fields' (Follett 1978: 98) but nevertheless, Lyons had begun the process with seemingly genuine intentions.

The contribution that live practices made to this shift in power dynamic must not be underestimated for the use of person-based interpretation was one important way in which Lyons began rigorously to implement his new approach.[56] In April

[56] Continuing with his progressive approach, Lyons went on to establish the first 'Children's Gallery' in 1931, located in the basement of ScM and aimed at enabling children

1924, in a gesture that should be viewed as a direct response to the Bell Report's recommendation that 'public demonstrations [be given] in the galleries by suitably qualified lecturers or guides' (Follett 1978: 26), and one which emphasised the crucial role live interpretation played in the active learning of the general public at ScM, Lyons appointed a retired naval officer, Engineer Captain E. C. Smith OBE, to the newly-created role of 'Guide Lecturer'. Smith's function was to deliver a programme of lecture tours *through* the galleries. It is one of the contentions of this thesis that in establishing this role, an outward demonstration of Lyons' commitment to improving visitor engagement and education, the prototype ScM Explainer was effectively created. Here for the first time is evidence of a role with the specific purpose of working directly to engage audiences inside the Museum's galleries. Comparisons between this brief and a current Job Description for an Explainer at ScM reveal a strikingly similar core function, with the purpose of the latter being 'To deliver high quality educational events and interactions in the interactive galleries for a broad range of audiences' (NMSI 2012: 1). The emphasis on direct interactions with a range of audiences and within galleries is as crucial to the role today as it was when it was first conceived. The breadth and range of the two roles have inevitably altered in the ninety or so years since Guide Lecturers were introduced, presentation styles have certainly shifted to reflect audience tastes and the role as I argue, has been shaped by the appearance of other facilitative roles along the way, but the Guide Lecturers can be seen as representing the foundations of the Explainer role as they were laid at ScM.

3.3.1. The habit of military appointments

Lyons' choice of an ex-military man, seemingly with little or no experience of presenting to audiences, to take up such an important new public communication role doubtless appears surprising now, but was indicative of his policy of recruiting to a range of cross-ranked Museum posts from retired senior non-commissioned officers of the Royal Engineers, Royal Navy and the Royal Air Force. Of course, it is possible that Lyons did not consider the Guide Lecturer role to be of any great significance and thus the experience and quality of the post-holder of little concern to him, although in view of his progressive spirit this seems unlikely.

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to understand scientific principles through interactives, before moving into the main galleries to see them in action through objects. Hugely successful, within a year, visitor numbers had doubled (Follett 1978).

The ex-military pool offered 'men with a good basic technical experience fully capable of dealing with enquiries from technically knowledgeable visitors' (Follett 1978: 58) and reveals that although outwardly committed to expanding the provision for the 'ordinary visitor', Lyons was apparently unable to shake off previously held attitudes and hierarchies concerning audience needs and wanted to ensure that the 'specialist' and 'technical' visitors were also properly catered for. Tom Scheinfeldt (2010) has argued that since Lyons and Sir Hugh Bell, the effective co-authors of the template that mapped out the direction of ScM in the years between the two World Wars, both hailed from scientific or industrial backgrounds alongside a 'potent strain of military or civil service' (Scheinfeldt 2010: 46), their combined characteristics 'provided the Science Museum with a clear and tangible basis for practitioner identity during the 1920s and 1930s' (2010: 47). Certainly there were significant numbers of ex-military men occupying posts across all ranks in the Museum during this time as part of a deliberate strategy:

> [B]eginning with Lyons, the Museum maintained a policy of hiring only former warrant and non-commissioned officers as gallery attendants - a policy designed to reinforce an ethic of scientific service.
>
> (Scheinfeldt 2010: 50)

As Scheinfeldt also points out, this recruitment practice ensured that ScM remained 'an entirely male dominated domain in the interwar years' (Scheinfeldt 2010: 59) and in terms of the lecturing provision, arguably beyond, since it was not until 1973 that the first, and as far as I could establish, the only woman was recruited to join the Lecture Service.[57] In a footnote, Scheinfeldt contrasts this approach to that of other large museums at the time, notably the Imperial War Museum, where women were 'active not only in the galleries but also in building

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[57] Miss Emma St-John Smith was appointed as 'Research Assistant/Lecturer' in March, having previously worked at the RI (Science Museum: 1973a). John Liffen, Curator of Communication, recalls that she was the only woman recruited to the Guide Lecturer role and, finding the work uncongenial, remained in the post for just a few years before transferring instead to become Information Officer (Liffen: 2014). Her name appears in the Museum Programme for 1977 against the delivery of one lecture on January 23rd, *Spinning Observed*, suggesting that while no longer formally in the role, she was willing to assist with delivery if required, albeit in the conventionally stereotypical female-oriented domain of textiles. The almost exclusively male environment at ScM at this time echoes that which was present in the RI during a similar period and described in Chapter 2.

collections, staging exhibitions and raising funds' (2010: 59). Lyons may have been perceived as a foreword-thinker, but his willingness for reform apparently only stretched so far.

Others have also observed that the overall approach to the running of ScM at this time had much in common with the military. In his introduction Morris (2010: 3) notes that unlike many other important cultural institutions the Directors of ScM have often come from outside rather than being promoted from within, with significant numbers hailing from a military background. Morris describes the atmosphere until the mid-1980s as 'one of officers and other ranks' (Morris 2010: 4), a view shared by Tim Boon who began working at the ScM in 1982. Where Morris focuses on the higher ranking staff, suggesting that some of the relationships between Directors and the Keepers, who had a senior curatorial responsibility, were 'often fractious' (Morris 2010:4), Boon observes that the atmosphere was one of 'officers and men, where the "and men" part were in the workrooms' (Boon: 2014). Boon recalls that it was around this time (early 1980s) that more women could be found in the workrooms, although they were yet to be seen in significant numbers in the more senior roles. As an aside, it is noteworthy that of the twelve who have led ScM since it became a fully independent entity in 1909, only one has been female. Dame Margaret Weston, Director from 1973-1986, unusually rose up through the ranks in the years since her appointment in 1955, and had experience of overseeing the development of the Electrical Engineering Gallery as well as being the first ever Keeper of Museum Services. Despite facing a 'degree of uncooperative disapproval from her colleagues' (Anthony 2010: 104) during her early years, presumably partly as a consequence of the uniqueness of her gender at such a senior level, she came to be very well regarded and it is perhaps no coincidence that the shift in atmosphere away from military-style hierarchies appears to correspond with the end of her Directorship – one element of her legacy. A further legacy is the establishment of the interactive Launch Pad Gallery, explored in Chapter 4 of this thesis, which came about under her leadership.

The current Curator of Communications, John Liffen, who has been employed in various roles at ScM for over forty years, suggests that the military titles were 'courtesy titles which some liked to keep going in civilian life' (Liffen: 2014) and it seems likely that particularly during the inter- and post-war years these military associations would have carried a degree of status and commanded respect. Additionally, as Follett has observed (1978: 47) by 1917 twenty-nine members of staff had left the Museum for service with the Forces, and with Lyons himself hailing from a high-ranking military family and having completed active service, the culture of ScM at this time is inextricably linked with military associations.

With the emergence of the Guide Lecturer role in 1924, Capt. Smith embarked on a delivery programme that consisted of giving a lecture tour in the galleries twice daily, morning and afternoon, Monday to Friday. Despite his apparent lack of obvious suitability as a communicator his tours proved highly popular with the general public and particularly with parties of schoolchildren.[58] In 1928 Mr G Tilghman Richards, an engineer who had been appointed to the Museum in 1924 as a Professional Assistant was employed as successor to Smith following the latter's resignation for reasons that are unclear (Science Museum: 1953).[59] Under Richards' delivery the popularity of the guided tours continued to rise, a development later considered surprising 'because there [was] no denying that Richards, though extremely knowledgeable, was no master of the art of lecturing' (Follett 1978: 105). It is impossible to accurately determine anything of the physical and vocal presentational style of either Smith or Richards, although it might be assumed, particularly in the case of Smith and in view of his military background that the approach might have been precise and to the point with little room for embellishment. In April 1930 Mr S Groom, formerly a secondary school science teacher, was appointed as Guide Lecturer, continuing to serve in the role for twenty-eight years until his retirement in December 1958 (Science Museum: 1959). Evidence in the form of scripts or any other documentation that specifically indicates what these early Guide Lecturers said and did during their lecture tours is elusive, if even extant, yet given their positive, successful reception it must be

[58] Follett cites visitor figures of over 4000 in the period April-December 1924 (1978:104).
[59] Follett's account (1978: 104) suggests that Smith did not retire until April 1929, which would have meant that in the preceding 12 months there were two Guide Lecturers. However, the 1953 Annual report describes Richards as **replacing** Smith. I could find no other evidence to corroborate either view. In either event Richards was first employed in a different role in 1924 and it can thus be assumed that he would have been familiar with Smith's approach to Guide Lecturing.

assumed that they were interesting and even pleasurable for visitors. One view might be that at that time such was the public's thirst for information and diversion that the content outweighed the standard of delivery and public appetite for learning was great. The introduction of the Guide Lecturers coming as it did during the inter-war years may also offer a further explanation of their appeal – after four years of bitter and devastating conflict on such an enormous scale the public were ready to put 'strife and upheaval [and…] the degradations of war' (Scheinfeldt 2010: 51) to one side and concentrate instead on human ingenuity harnessed for positive advancement and productivity. Viewed from this perspective it might be suggested that publics were keen to embrace the momentary escapism offered by immersing themselves in agreeable guided encounters with scientific objects whilst contemplating the possibilities they might offer for an improved future.

3.3.2. Status of the Guide Lecturer role

The Guide Lecturers seem to have occupied an unusual, hard to define space in the overall ScM order. Holding a higher degree of status than the Museum Attendants the Guide Lecturers were not as well regarded as the Keepers and curatorial staff, despite some of them having been educated at prestigious universities and some bringing teaching or university lecturing experience to the role. In this respect, attitudes towards the Guide Lecturers can also be seen as radically different to those directed towards the RI scientists. Although a large part of their work was concerned with giving public lectures, the RI scientists were also considerably engaged in experimentation, often making paradigm shifting discoveries and inventions. The celebrity-like statuses of Davy, Faraday and Tyndall in their own times cannot be wholly compared with the Guide Lecturer role – one was responsible for the actual production and then dissemination of new knowledge, the other merely for its explanation. With regard to the status of the two roles then, they were very far removed, but the specific activity concerning the ways in which knowledge was shared with publics can be seen having similarities, as can the ways in which the Guide Lecturer role itself developed.

The precise status of, or place occupied by the Guide Lecturers within the broader Museum hierarchy in the first decade or so, and indeed further beyond, is difficult to determine with certainty. As described (1.1.1) the names of some of them appear on an audit of 'Senior Staff at the Science Museum, 1893-2000' (Morrison 2010: 324-328). It is justified here to shift beyond the confines of this section's defined period 1924-30, in order to consider the evidence presented in this audit. Information is presented in four categories: name of the individual, year they started at ScM, year they left, and highest position reached. Included in the list are the names of five individuals, three of whom have been previously introduced here, whose highest position reached was Guide Lecturer: Capt. EC Smith, Mr GT Richards, Mr S Groom, Major VC Wall and Mr JC Cain. My research has identified the following individuals serving as Guide Lecturers:

Name	**Year began as GL**	**Year finished as GL**
Capt. EC Smith	1924	1928
Mr GT Richards	1928	1953
Mr S Groom	1930	1958
Mr GBL Wilson	1953	1956
Major VC Wall	1956	1976
Mr J van Riemsdijk	1962	1970
Mr J Freeborn	1970	c. 1978
Mr A Tulley	1976	c. 1986
Mr A Wilson	1977	c. 1986
Mr J Stevenson	1979	c. 1986

(*Figure 3.3*) Table showing Guide Lecturers and their years of service

Of these, Mr GBL Wilson, Mr J van Riemsdijk and Mr A Wilson are also featured on the 'Senior Staff' audit, all having achieved a higher rank than Guide Lecturer, but Mr J Freeborn, Mr A Tulley and Mr J Stevenson do not feature at all. This is surprising in view of the fact that evidence of their regular lectures and activities is readily accessible in the Z Archive, and in the cases of Tulley and Stevenson, they went on to become significant figures in the Education Service and key contributors to the development of the Launch Pad gallery during the 1980s. Also noteworthy is the absence in my research of any reference to Mr JC Cain, who according to the audit, served as a Guide Lecturer between 1959-1961. These discrepancies suggest that the audit cannot be taken as entirely accurate, also calling into question the inclusion of the Guide Lecturers. As noted (1.1.1) their names may appear on the list simply because the complier did not know where else to include them. But if this so, it further muddies the waters and questions regarding their status remain - the fact that they *might* have been considered senior enough to feature on a list of 'Senior Staff' reveals that their specific status was likely not readily known and difficult to define.

A photograph from September 1933 depicting Sir Henry Lyons and numerous staff (*Figure 3.4*) adds further complexity. The image is one of a series of group photographs of ScM staff taken at the request of Lyons on the occasion of his retirement (Herrick: 2016). What appears to be a sheet of light coloured fabric has been tacked up on the stone wall behind them and the atmosphere of the gathering is quite formal. It is clear that the assembled group in this image comprises staff of a lower ranking level – including draughtsmen, warehouse packers and the catalogue stall attendant. The two Guide Lecturers at this time, Richards and Groom are also present in the group, occupying arguably the next-best position after Lyons himself – seated on the front row, immediately to the left of the centrally-placed Lyons. Their somewhat casually crossed arms and legs, which point towards each other, distinguish them from those immediately around them, who generally appear more rigidly composed. It is, of course, impossible to know, but there appears an aura of relaxed confidence associated with Richards and Groom that is not discernable amongst the other individuals. The institutional role of the figure to Lyons' right, Mr FG Skinner, is not listed, but Skinner's name also appears on the 'Senior Staff' audit as having reached the rank of Deputy Keeper, and the reason for his presence amongst this particular group is unknown.

(*Figure 3.4)* Photograph of ScM Director Sir Henry Lyons with assembled staff, September 1933. © *Science Museum/Science & Society Picture Library.*

The inclusion of Richards and Groom in such a group further suggests that, in 1933 at least, their role was difficult to define and position. At this time, and for many years to follow, only two Guide Lecturers were employed at once and there was no other formal education provision. In this sense the role appears to have been quite isolated from others. The specific reasons for including them in this particular grouping cannot be known and may have been a 'best-fit' solution – perhaps this gathering simply mopped up all the hard to place roles that did not function as part of larger departments. In any event, their appearance here suggests that their ranking in the organisational hierarchy was not considered particularly senior.

In time the Guide Lecturers, like the RI scientists, came to have their own Assistants who sourced and set up the equipment for demonstrations and generally supported the practical organisation of lecture-demonstrations. John Liffen, employed as a Museum Assistant in the Lecture Service from 1973-75, describes his own experience:

> Our job was to prepare the demos, run them if appropriate, open up the theatre at the beginning, attend to the theatre lighting, operate the slide projector, and generally make it easy for the lecturer. We never addressed the audience ourselves. Afterwards we had to take down and put away the apparatus.
>
> (Liffen: 2014)

Liffen declares a lack of personal pleasure in the work largely due to the fact the 'assistants were expected to build new demonstration apparatus and [he] had no such skill, nor any interest in acquiring it' (Liffen: 2014). Tim Boon's first job at ScM in 1982 was also as a Museum Assistant, and he augments this vision of the role as essentially providing technical support:

> I was allocated to Lecture Service because I had some practical skills and in particular was quite handy with a soldering iron, so I could build circuits for them (…) the duties were essentially to be the resident technician for the lectures that were held.
>
> (Boon: 2014)

The Museum Assistant role thus presents a parallel role to the structures established at the RI. All the scientist-lecturers had assistants who helped set up the demonstrations of experiments in the lecture theatre. Since they were usually skilled and capable scientists themselves they also assisted in the actual experiments in the laboratory and sometimes, as in the case of Faraday, rose dramatically from assistant to scientist-lecturer. The examples of Liffen and Boon, both of whom also went on to hold senior positions within ScM, points to a similar pattern of the potential for significant rises in status amongst the ranks of Museum Assistants, although interestingly, this appears to have been less evident in the experiences of the earlier Guide Lecturers.

Boon recalls that the pay grade for ScM Assistants was on a par with the clerical officers or clerical assistants within the Civil Service, an indication that the role here was not considered overly skilled, despite the requirement for developing the lecture-demonstration resources. Discussing the subject of pay and grading for current Explainers as well as the landscape in the early 1980s, when he was employed as a Museum Assistant, Boon observed that the role was 'for somebody formally with four O Levels' but that he was part of the 'dip in the economic cycle where basically graduates started getting jobs that people who'd left school at 16 would have got' (Boon: 2014). As a consequence ScM found its lower to middle-ranking roles filled with skilled and highly educated personnel, inevitably impacting upon aspects of its structures. As Boon puts it, 'basically, we graduates came in with our highfalutin ideas about social history and I think we, willy-nilly, changed the culture of the junior ranks of the Museum' (2014). This was some sixty years or so after the first Guide Lecturer was appointed and although it has not been possible to ascertain the pay grade of the Guide Lecturers themselves, it is highly likely they would have occupied a higher position than the Museum Assistants. Liffen's recollection (2014) is that they were possibly at the same level as the Assistant Keepers but certainly 'transfers into and out of Lecture Service didn't happen often' and that many Lecturers stayed within the Service for many years. Whether this was through lack of progression opportunities, as is often the case for Explainers in SMG museums today, or simply a preference for remaining in a job that was rewarding and satisfying, could not be determined.

Institutionally then, the Guide Lecturer role was feasibly considered as part of a lesser order, and this may have partly been due to the difficulties of defining a specific place for a role routinely occupied by just two individuals. In terms of their impact and contribution to the development of live-person interpretation however, their influence was considerable.

3.4 Guide Lecturers: developing practice (1951-1959)

Since I was unable to locate any meaningful evidence concerning lecture content and the daily routines of the Guide Lecturers during the first twenty-five or so years of the position, it is necessary to jump forwards to the 1950s, a period when evidence is more readily available. One of the strongest organisational anxieties emerging from my scrutiny of that evidence focuses on a decline in the number of lecture attendees after the Second World War, despite a varied programme on offer. Following the re-opening of the Museum after the War the Lecture Service was resumed in the middle of 1946, although it was not until late in 1948 that all of the galleries were finally ready to receive visitors again.[60] The 1952 Annual Report refers to the decline as 'steady' and shows figures of 26,962 for 1947 reduced to 14,845 by 1951. In attempting to understand the reasons behind the decline the Report steers clear of implicating the performance of the Guide Lecturers, observing that there 'appears to be little reason to attribute this to any alteration in [their] powers or assiduity' (Science Museum 1952: 43). Instead, it speculates that competition from the BBC in the form of its 'numerous and excellent scientific talks [had] slaked the public's thirst for knowledge' and, importantly, it wonders 'whether the function of the Museum Lecturers should not in the future be taken to be primarily demonstration, which is not provided elsewhere, rather than verbal information, of which there is today a profusion'. Certainly it muses that reversal of the decline in numbers could 'evidently be brought about only by increasing the interest of these lectures to the present type of visitor', recognition of the fact that steps needed to be taken to ensure lectures catered for an increasingly demanding audience. As will be seen later in the chapter, practical demonstration was to become a significant feature of the Guide Lecturers' work. Jean-Baptiste Gouyon's article (2014) exploring the visual display of space science and nuclear physics at ScM and on television in the 1950s-60s, highlights the ways in which the Museum quickly sought to embrace and engage with television, particularly in terms of allowing cameras through the doors for numerous live broadcasts from its galleries. Citing the 1964 Advisory Council Report commenting on the relationship between ScM and television, he observes that it was regarded as 'a good thing, if one views science education from a national and not a parochial stand-point' (Gouyon 2014: 41), a view which indicates a shift in thinking from the aforementioned 1952 perspective that regarded television as a significant threat.

The Annual Report for 1952 refers to two Guide Lecturers: GT Richards, who retired in the following year after twenty-nine years, having been awarded an MBE for his services to the Museum; and Groom, who was also awarded an MBE in 1956. By this time the Lecture Service was very well established and its regular activities unrecognisable from the twice-daily tours of the galleries as performed by Capt. Smith in 1924. The approach was for each Guide Lecturer to have a specialism, one in science and the other in engineering, each delivering a range of lectures

[60] ScM officially reopened on 14 February 1946 (Parsons 2010: 76).

accordingly and 'upon matters relevant to the collections both in the lecture theatre and the galleries, and (…) special lectures on request' (Science Museum: 1952). By the start of 1954 a total of 60 separate events were shared equally between the two Guide Lecturers (Science Museum: 1954):

	Gallery Lecture	Theatre Lecture
Engineering subjects	17	13
Science subjects	14	16

(*Figure 3.5*) Table showing breakdown of Guide Lecturer programme, 1954.

The 'lecture theatre' (*Figure 3.6*) had begun its life in 1930, in the wake of Lyons' implementation of the Bell Report's recommendations regarding the physical expansion of the Museum, and was initially known as the 'conference room'.[61] Whatever its original intended purpose Follett describes how it 'immediately came into daily use by the Guide Lecturers' (1978: 57) and consequently quickly became known as the 'lecture theatre'. The acquisition of the Lecture Theatre had coincided with the commencement of Groom's employment and I suggest that coming as he did from a classroom teaching environment he was more naturally comfortable with the formality offered by a space with clearly delineated areas for both presenter and audience, rather than a type of looser promenade performance in the galleries. As such, Groom was likely the driving force behind its 'immediate' acquisition. It can be seen (*Figure 3.6*) that the lecture theatre space offered opportunities for a traditional formal educational experience, with the raked seating rows and demonstration bench at the front – although in the (1957) example shown, the occasion of the lecture as part of a museum visit also apparently offered opportunities for a presentation style that might be viewed as less conventional than that found in a school setting.

[61] Although taken in 1957 the image shown (*Fig. 11*) is of the original space.

(*Figure 3.6*) ScM Lecture Theatre, 1957(Lecturers unknown) © *Science Museum/Science & Society Picture Library.*

Comparisons with the lecture theatre space at the RI can also be made and although the ScM version is less semi-circular in shape than the theatre at the RI, the effect of defining a performance space with good sightlines is similar.[62] There would doubtless have been differences between the approach taken for the delivery of a theatre lecture and that for a gallery lecture, and as previously suggested Mr Groom was probably more comfortable with the former. The next section explores what is known about Groom's character and presentational style.

3.4.1. Mr Groom and an insight into Guide Lecturer performance style

To mark the occasion of his retirement in 1958 Groom's own reminiscences from his twenty-eight years service as a Guide Lecturer were published in the *Bulletin* (No. 9 Summer Term), a termly newsletter for schools produced by the Guide Lecturers and established in 1955 (Anon 1955a: 9). This brief collection of memories amounting to just nine paragraphs and covering a little over two pages

[62] Thomas Webster, the architect of the original RI lecture theatre was inspired by the principles of the medical anatomy lecture theatres of European universities (e.g. Padua 1594 and Leiden 1596), with their very steeply raked seating encircling the demonstration bench offering excellent views and acoustics for all audience members.

provides a valuable glimpse into audience behaviours as well as offering an insight into Groom's own attitudes towards the role:

> In the Science Museum, as far as the public lectures are concerned, the audiences consist largely of birds of passage, attending once or twice during a visit to London and perhaps coming again a year or two later after journeying to distant parts of the world. There are usually however a few regular attendants, retired people living in the Kensington area who, though they may not realise it, perform a very important function. The presence of one or two who are remembered to have attended the previous lecture on the same collection ensures an effort being made by the lecturer to vary his subject-matter or at least his phraseology!
>
> (Science Museum 1959a: 12)

Groom's tone here, and throughout, is somewhat light-hearted but also gives an indication of the creative effect of his language usage, producing interesting images in the minds of his audience. His depiction of museum visitors as analogous to 'birds of passage' returning after their migration elsewhere for instance, implies an imaginative approach. Without hard evidence of the actual content of Groom's lectures and tours only suggestions can be offered, but it seems possible at least, that in his work, his vocal descriptions of objects and their stories might have been similarly poetic and appealing. Importantly, his reminiscences also reveal that in common with the approach taken by the contemporary SMG Explainer, a script, or 'phraseology' was not rigidly adhered to. This desire for flexibility reveals Groom's understanding of the need to ensure that diverse audiences remain engaged and entertained, and his appreciation of the fact that returning visitors require variation to keep them coming back, knowledge likely enhanced by his experience of working as a schoolteacher. Groom then, was able to build on the transferable communication skills gained from his work as a teacher and successfully adapt to a different kind of presentational or performance role. His lightly humorous reminiscences describe various encounters with and observations of visitors and he clearly revelled in the role of storyteller. His recollection of a father and young son exploring the Foucault Pendulum in the Entrance Hall, for example, includes a section of their overheard conversation written in the vernacular to convey an element of their class and education and bring a sense of realism to the account, but it also exposes something of Groom's own taste for dramatic performance and sense of character:

> I heard a small boy addressing his father. "'Ere, Dad, what's this all abaht?' Dad was not going to admit ignorance, particularly to his own son, so, sizing up the situation quickly he replied. "Why, it's a pendulum, can't yer see. Look, there's the clock wot it's workin'". I did not intervene. Perhaps a father's prestige in the eyes of his son is even more important than scientific accuracy.
>
> (Science Museum 1959a: 13)

Again, it may be concluded that in his verbal encounters with audiences Groom would have applied similar narrative devices in order to bring colour and depth to his explanations of science, objects and their complex workings, aware of the need to draw a listener in with something more than cold scientific facts. Certainly there is a morsel of evidence hinting at Groom's performance style found in the same 1959 *Bulletin* celebrating his retirement and offering a short account of his contribution to the Lecture Service. Observing that his 'genial presence and sonorous voice will be greatly missed (…) to every one of his discourses he brought an air of freshness, enthusiasm and topicality which never failed to enchant his audience' (Science Museum 1959a: 1) a clear image of his energy and passion in delivery is established.

Anecdotes such as that featuring the father and son, which imply an element of misunderstanding or confusion on the part of the visitor point to Groom's pride in his work, confirming his belief in the fundamental necessity for the presence of a Guide Lecturer in the galleries to assist with comprehension, but also suggest the merest hint of a stance which conveys satisfaction at his own sense of superior knowledge. His final paragraph offers one of the clearest illustrations of his own defining attitude towards the role, his last ever words in the capacity of Guide Lecturer stating that:[63]

> The word "Museum" unfortunately suggests to many people a certain degree of stuffiness, dullness and monotony but it can certainly be said that these have no place in the life of a lecturer at the Science Museum (…) My

[63] Jean-Baptiste Gouyon notes that Groom was brought back in January 1959, shortly after retirement, in order to demonstrate certain exhibits in the Children's Gallery for a live broadcast of the BBC Children's Hour programme Science on Show (Gouyon 2014: 41).

> successor may well witness even greater changes. He may be quite sure of finding his task an interesting one.
>
> (Science Museum 1959a: 14)

His pleasure in the job and enjoyment of its variety is evident and he would have seen great changes during his twenty-eight years in the role. Groom highlights a lack of 'dullness and monotony' in the work of the Guide Lecturer, implying instead that the opposite, excitement and variety, are more typically part of the experience. Definitions of what constitutes an entertaining and enjoyable museum experience have also shifted over time and it can be assumed that Groom's understanding of these elements would be somewhat at odds with the expectations of an audience today. The photograph of Groom at work (*Figure 3.7*) certainly depicts an experience that would likely be less attractive to young contemporary audiences with expectations of participation, immersion and interactivity.

(*Figure 3.7)* Mr Groom giving a gallery lecture to schoolboys at the ScM, October 1936. © *Science Museum/Science & Society Picture Library*

While this photograph appears to have been staged to some degree - the positioning of the schoolboys enables a clear view of Groom and it is assumed that without the presence of a photographer they would be more closely positioned around him and the items being described – it nevertheless clearly depicts the kind of activity undertaken by the Guide Lecturers during the 1930s-1950s. Groom is clearly in explaining mode, conducting a gallery lecture, while the physicality of the audience members suggests that the expectation of their role was quiet attentiveness rather than active participation.

As described at the start of this section (3.4.) by 1952 it was apparent that audiences for theatre and gallery lectures were dwindling on a significant scale. The threat posed by television was one possible cause but it is also possible that audiences had become weary of a programme that offered only two models delivered by the same two members of staff. The Museum needed to ensure that it retained its existing audiences whilst also attracting new. Its first serious consideration of how a practical addition to its public offer might serve the dual purpose of revitalising a potentially outmoded model and also draw back dwindling audiences was about to be made. Some forty or so years after the Bell Report had recommended the inclusion of 'public demonstrations', having noted that these were regularly provided at other museums (Follett 1978: 103), ScM took seriously the proposal and began to explore appropriate provision for them.[64]

3.4.2. September-December 1954: introducing practical demonstration to the lectures

The Director in 1954 was F Sherwood Taylor (Director 1950-56), who had begun his own career as a teacher of science and then Lecturer in Chemistry at Queen Mary College, and had first-hand knowledge of the lecture-demonstrations at the RI having delivered the prestigious Christmas Lectures there in 1952, with a lecture entitled *How Science has Grown* (Royal Institution: 2014b). By this time the Christmas Lectures had been firmly established and highly successful for over one

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[64] Follett identifies how as early as 1925 ScM was trying out the lecture-demonstration form (1978: 104). He describes how on public holidays the Museum often became so crowded with visitors that it was impossible to conduct the usual gallery-based lectures and instead on those days 'lecture-demonstrations' were given in the classroom spaces that held up to fifty people. It is unclear what form and content these had and precisely what was done in the name of 'demonstration', or indeed for how long these were available, but in 1928 Richards began experimenting using lantern slides to illustrate his lectures and this seems to have occurred at least into the following year. A somewhat haphazard and unstructured approach to the inclusion of demonstration then, that took many years to become formally established.

hundred and twenty-five years, and presenting at the RI afforded Sherwood Taylor the opportunity to personally experience the powerful effect that observation of the demonstration of practical science in action could have on an audience. Indeed, when the Special Demonstration Lectures were eventually delivered for the first time at ScM in July 1955, the *Bulletin* outlined the context for their establishment leaving no doubt as to their source of inspiration:

> A few years ago our Director, Dr. F. Sherwood Taylor, gave the famous Children's Christmas Lectures at the Royal Institution, and he was so struck with the response and the enthusiasm which they aroused that he resolved to introduce some similar lectures in the Science Museum.
>
> (Science Museum 1955a: 1)

Sherwood Taylor's active participation in the unique moment of performance at the RI evidently had such a powerful impact on him that he sought to recreate something similar at ScM. This response resonates with Stephen Curry's 'slender, unbreakable thread' (2013) (see 2.3.2) tying the RI speaker, in this instance Sherwood Taylor, back through the past to its long-celebrated scientists and traditions, forming an intangible connection not just between him and RI scientist-lecturers from the past, but also between the organisations of ScM and the RI themselves.

Marvin Carlson has observed that given the highly concentrated form of theatre, not usually lasting more than two hours or so, it has 'always sought to provide orientation aides in the form of such devices as already known plots, already familiar characters, already experienced situations' (Carlson 2003: 166) and in this there is some plausible link with Sherwood Taylor's ambitions. He was seeking to consciously emulate the successful practices of the RI and in so doing must have been aware that audiences who came to ScM may well have also previously encountered the presentations there. It may be said that he was exploiting their pre-established performance conventions. Intertheatrical considerations may also have some bearing here, and Carlson's notion of 'recycling' (2003) coupled with Bratton's concept of the 'intertheatrical' (2003: 27-38) offer a persuasive framework for understanding the lecture-demonstration form as a 'mesh' of interconnected ideas and moments that have already been played out in other contexts. Section 3.6 considers these ideas in more depth.

Sherwood Taylor thus identified the inclusion of regular practical demonstrations as a vital addition to the theatre lectures and one that was intended to offer something more enticing than simply 'verbal information'. He was supported in this venture by the findings of the Conference of Schoolteachers that had been held at ScM on 11 September 1954. Conference participants articulated a desire for 'demonstrations of experiments which were beyond the means of the school laboratory' (Anon 1954a: 1) and it was apparent that those science teachers consulted discerned great value in this practical activity, and thus, it was hoped by the Museum, would make regular visits with large parties of schoolchildren. Sherwood Taylor, perhaps mindful of ScM's commitment to the blend of contemporary and historical science and its various applications, was nevertheless concerned that its lecture programme did not become purely an adjunct to the school science curriculum. Instead, he expressed keenness that the Lecture Service should concentrate on the 'demonstration of the historic experiments which form milestones in scientific progress' (Sherwood Taylor: 1954). Indeed, later, once the practice of performing lecture-demonstrations was firmly established in the culture of ScM, it was sometimes employed as a means of recreating some of the pioneering and revolutionary experiments of the nineteenth century.[65] As an aside, this practice could be regarded as a rather tantalising literal example of Schechner's 'restored behaviour' (1.5.1): while the available evidence illustrates ingenuity in the later Lecturers' approaches to the devising of lecture-demonstrations, the commitment to keeping alive and re-performing scientific practices of the past, was also strong amongst them.

The actual process of introducing practical demonstration into the lectures was first begun in 1954 with the allocation to the Lecture Service of a room in the basement for use in preparing demonstrations and storing the necessary

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[65] Examples include John Freeborn's September 1972 lecture for school children aged 11-14 entitled *Dirt, Dust, Flashes and Bangs* in which he demonstrated the principles behind James Wimshurt's electrostatic influence machine and included the demonstration of 'some electrostatic toys which were made for Wimshurt's lectures' (Science Museum: 1972a*)*. Wimshurst had developed his idea between 1880-1883 and had himself given a lecture-demonstration at the RI on April 27th 1888. Similarly, in February 1973 J.M. Ward delivered a lecture-demonstration for Sixth Formers called *Power Chemistry* in which he explored and demonstrated some of Faraday's discoveries concerning electro-chemistry (Science Museum: 1973b).

equipment. This new workshop was fitted with benches, electricity and gas, and the purchase of new tools to the value of about £25 was made (Anon 1954b: 1) Additionally, a new post, 'demonstrator-projectionist' (Science Museum: 1954) was created at Museum Assistant grade and filled internally by a craftsman from the metalworking shop. One element of his job, later to become a significant part of the remit of subsequent Museum Assistants, confirmed by the recollections of John Liffen and Tim Boon, was to be the sourcing and construction of apparatus for the demonstrations. A highly significant development towards fulfilment of Sherwood Taylor's ambition occurred on 20 September 1954 when he wrote to Sir Lawrence Bragg, at that time Director of the Davy-Faraday Research Laboratory at the RI, discussing his plans for the 'provision of lectures illustrated by experiments' at ScM (RI MS WLB-90p). Bragg's response, dated 21 September 1954, confirms that he had already commenced with his own plans for a new series of lectures for school children at the RI 'with experiments on an impressive scale' (RI MS WLB-90p-02). Mindful of the long-established reputation and traditions of lecture-demonstration at the RI Bragg reiterates numerous times in the letter how well-placed and well-equipped it is for such activity, but also points out that at that point in time it was considered experimental activity.[66]

Bragg's letter to Sherwood Taylor also highlights his concern that the two organisations should not develop 'two rival sets of lectures' and, rather generously in view of the RI's much greater experience and reputation in the field, suggests that they could instead 'complement each other in some way' (RI MS WLB-90p-02). Extending an open and informal invitation to meet with Sherwood Taylor when he was next in that part of London, this was speedily followed up with a meeting on 27 September 1954, the details of which were summarised by Sherwood Taylor in a memo to David Follett (Sherwood Taylor: 1954).

Sherwood Taylor's memo also highlights the two organisations' planned intention not to tread on each other's toes:

[66] In the event the RI lecture-demonstrations were a resounding success and demand for tickets far exceeded supply. For example, in his planning (letter from Bragg to R Beloe, 14 June 1954) Bragg had anticipated about 5 tickets per school be allocated, yet in a letter to the Chief Education Officer for Croydon (8 August 1954) he reports that the number of tickets requested was nearly three times greater than the capacity of the RI lecture theatre (RI MS WLB_90).

> Sir Lawrence Bragg is very keen on [providing lectures for schools] and evidently regards it as an important part of the function of the RI. Consequently he is taking much trouble to provide a series of brilliant experiments much beyond our scope. He is concerned that there should be no overlap, but is very ready to cooperate.
>
> (Sherwood Taylor: 1954)

The Museum consequently initially prioritised its programme on the needs of younger students and as the Minutes of a special meeting held to discuss the issue in the Director's Office on September 30 1954 record, instead of Sixth Form students ScM would concentrate on 'lecture-demonstrations for the general public, and for students of Fifth Form standard and below' (Anon 1954c: 1). The Minutes also reveal enthusiasm for developing new demonstrations from the Guide Lecturers Groom, and a new recruit appointed earlier in the year, Mr GBL Wilson. Groom highlighted his own 'Colour' lecture that already included several simple demonstrations, suggesting that with some additional apparatus more presentations could be incorporated. A sharing of ideas for possible new lecture-demonstrations occurred in the meeting with the following topics proposed: Sound, Wave Motion, Scale of Radiation, Discharge of Electricity through Gases and Electrostatics (Anon 1954c: 1). The meeting concluded with the Guide Lecturers resolving to prepare 'some three or four lectures (…) submitting estimates for their needs of apparatus' and in this way ScM's commitment to the provision of a programme of regular lecture-demonstrations was sealed.

A longer-term commitment to steering clear of the RI's intended audiences was not necessarily secure however, and it appears that the decision to concentrate on Fifth Form pupils so as 'to avoid competition with the RI' was quickly re-considered, with the Minutes of the seventh meeting of the Committee on Provision of Children's Interest noting that 'Sixth Forms should not be forgotten, as the Royal Institution could not meet the whole demand' (Anon 1955b: 2). The Committee, with Sherwood Taylor's support, concluded that pitching to advanced Sixth Formers might be beyond the capacity of the Museum, and presumably the capabilities of the Guide Lecturers, so this was proposed as a possible venture at a later stage through the use of external lecturers once 'lectures were well established and audiences were assured' (Anon 1955b: 2). Jean-Baptiste Gouyon

(2014) overlooks any sense that younger children were ever part of the intended audience suggesting instead that from the outset, the lectures for schools were 'aimed at sixth form school children' (Gouyon 2014: 4). Contradicting this however, the evidence in the Minutes of the Special Meeting on September 30th 1954 shows that initially at least, the intention was to avoid this age group.

The RI's contribution towards establishing the Special Lecture Demonstrations as a regular feature at ScM was to go beyond courteous collaboration in order to avoid overlap of audiences and theme. A document, *Action Arising from Conference of Schoolteachers,* sets out the two principal actions as being: a) to introduce demonstrations of scientific experiment into the lecture service; and b) to develop methods of publicising these to schools. Reported under (a) is a reference to an event that is of critical importance to this research:

> The Guide Lecturers attended the lecture-demonstrations for schools given by Sir Lawrence Bragg at the Royal Institution in December, to study the methods employed.
>
> (Anon 1954b: 1)

This twenty-five-word statement, located in an unpublished document and filed in ScM's rather haphazard Z Archive, confirms the physical presence of ScM Guide Lecturers, Groom and Wilson, at the RI lecture-demonstrations, and at a point in time before they began delivering their own versions. Although no further archival evidence relating to their attendance at the 1954 RI lecture-demonstrations could be found, considering Sherwood Taylor's positive opinion of the RI's lecture provision it is assumed that these observations were undertaken with a view to emulating them and identifying the elements that contributed to their success. The plural reference to the lecture-demonstrations suggests that the Guide Lecturers experienced at least two, and this would have given them the opportunity to begin to understand the performance strategies adopted. Later in this chapter (3.6) I interrogate this moment and its implications in the light of the theories of transgenerational transmission of embodied practices central to this research and also explore a further moment, in 1957, when cooperation between ScM and the RI led to elements of shared practice (see 3.6.2).

3.4.3. Developing lecture-demonstration practices at ScM (1955 - 1959)

When GBL Wilson was recruited to the role of Guide Lecturer (1954), succeeding Tilghman Richards as Guide Lecturer in Engineering Subjects, the service perhaps acquired a little more than it had anticipated. An engineer who had studied science at Cambridge, Wilson had an active and surprising parallel life in the world of ballet, including from 1948 as Associate Editor of the publication *Ballet Annual*, and after years of research, in 1957 as Editor of Penguin's *Dictionary of Ballet*, which ran to three editions (Arenapal: 2014). He was also an accomplished photographer and his images of ballet performances and dancers on and off-stage were published in various contexts including in his own column in the *Dancing Times,* up to and after his death in 1984. Although only a Guide Lecturer for two years – he moved to work in the Children's Gallery in 1956 – Wilson's deep underlying interest in ballet implies a keen affinity with a performing art and one that may have furthered his understanding of dramatic effect on an audience. Importantly, as one of the Guide Lecturers to observe the RI lecture(s) in December 1954, Wilson had first-hand experience of the successful presentational style. It appears that Wilson had a taste for the dramatic when it came to his own performance style, although this is impossible to discern from the description of the Guide Lecturers in the inaugural issue of *Bulletin* (spring 1955). Somewhat dryly introducing Groom and Wilson as being at the 'disposal of any school or party who wish to be shown round the museum or have a particular section explained to them' (Science Museum 1955b: 2) the *Bulletin* goes on to list the Guide Lecture Services. Its tone fails to capture any evocation of the potential excitement that might be generated by the Gallery and Theatre Lectures, focussing instead on organisational and administrative details alongside a polite explanation of their potential benefit:

> The parties should be of not less than six or more than twenty-five persons and application should be made on Form 157C which can be obtained from the Museum. These guided tours last about three quarters of an hour, and can be of great value. Instead of the visitors wandering aimlessly about the Museum, trying first one handle than another, they are shown selected objects which are thoroughly explained, so that they leave the Museum a little wiser than they came into it – and with their interest stimulated.
>
> (Science Museum 1955b: 2)

Wilson seemed to have had more dramatic ideas concerning the effect he intended his lectures to have on audiences and a mere 'stimulation of interest' was perhaps not sufficient for his aims. The second issue of *Bulletin*, published in Michaelmas Term 1955 summarises the Special Lecture Demonstrations for Schools that were given for the first time in July that year, a tangible follow-up to observations at the RI in December 1954, and gives special mention to Wilson's efforts:

> Some of the apparatus for Mr Wilson's lectures was lent by engineering firms (and some by the Royal Institution itself). The most spectacular was the demonstration of the Rover Gas Turbine, given in two of the lectures. This remarkable piece of modern engineering (with a rotor which turns at 45,000 revolutions per minute) filled the Museum with an unaccustomed sound, and a burst of smoke from it emerging from the Lecture Theatre door, caused a Warder on the top floor to give the fire warning (…) The success of the lectures more than repaid the immense amount of work involved in preparing them.
>
> (Science Museum 1955a: 2)

Wilson would doubtless have had an awareness of the potential impact his choice of apparatus might have on the audience – he would have had to test it in the workshop before presenting it to the public and thus been prepared for the unusual noise and smoke. In this sense this example hints at his taste for theatrical effect, quite possibly influenced by what he had witnessed at the RI. However, his appetite for the dramatic perhaps went unappreciated by those with a responsibility for the smooth-running of visitor operations, since when he repeated the demonstration in the July lecture series the following year the *Bulletin* reports that the 'Wardens had been fully warned of the gigantic noise they should expect' (Science Museum 1956: 2).

Over the next few years the popularity and success of ScM's lecture-demonstration series continued to rise. *Bulletin* reports during 1955-58 suggest that the July Special Lectures for Schools were highly successful, the Summer 1958 edition for example, publishes audience figures of 2,249, in addition to an unusually scheduled performance of the Lecture Series in the March of the same year. ScM Annual Reports for the years 1955, 1957 and 1958 make numerous references to the growing presence of demonstrations and experiments as part of the regular lectures for schools. The 1957 Report in particular provides the following summary of the Lecture Service:

> Pursuing the policy of making the public lectures more closely related to the Museum Collections, the afternoon lantern-lectures in the Lecture Theatre have, since October 1, been replaced during school term time by guided tours of the galleries. The Lecture Theatre has thus been freed for lectures requested by schools, at which demonstrations are being introduced where practicable.
>
> (Science Museum: 1957)

Emerging from this description are several important features relating to contemporary practices. Firstly there is the developing attempt to refine programme content so that it aligns more effectively with the collections, a policy that remains significant in SMG museums and has been of particular importance at NMeM in recent years as part of its restructuring activity. Secondly the lantern-lectures, becoming outmoded by this time, are replaced by activity that situates Guide Lecturers back in the galleries, amongst the collections – an important function of the contemporary Explainer's purpose. Finally, there is evidence of increasing efforts to incorporate practical demonstrations in the Lecture Theatre – echoes of long-standing RI practices emerging at ScM. Continuing to be impressed and overtly influenced by the RI, in 1958 ScM set it sights on copying their arguably most-successful event:

> We are hoping to be able to give a course of Christmas Lectures for school-children – probably in the first week of January. Christmas Lectures (that is, lectures held in the Christmas holidays) all derive from those given at the Royal Institution since 1825. Many other scientific institutions, museums and learned societies now give them, but this will be our first attempt.
>
> (Science Museum 1958: 1)

The very first two ScM Christmas Lectures, titled *From Man Power to Atomic Power* and *The Story of Flight,* were each delivered four times by Major VC Wall, who had been recruited as a Guide Lecturer in the aeronautical and engineering subjects in October 1956 to replace Wilson, following his promotion out of the Lecture Service. The commencement of these Christmas Lectures appears to have heralded a time of rapid expansion in the Lecture Service despite the fact that Guide Lecturer provision remained at two.[67]

3.5 The Lecture Service: consolidation and decline (1960 - 1980)

The 1960 *Bulletin* includes a list of the available programme, describing the daily tours for the general public and request lectures for schools as the ‘bread and butter’, while referring to Christmas Lectures, Holiday Lecture Demonstrations and ‘now-famous’ July Lecture Demonstrations as the ‘jam’ (Science Museum: 1960). The analogy indicates a difference in form and content, implying that the ‘jam’ offered something more desirable and entertaining. Another document, *A Science Museum’s Contribution to Science Education* (1962) provides a kind of manifesto of aims and intentions and also provides detailed descriptions of the variety of lecture types then on offer. These are revealing since with regard to the Holiday Lectures, as opposed to those intended for school parties, they refer to a ‘lighter touch’ and a ‘high standard of scientific entertainment’, concluding that ‘Science can be fun as well as a hard academic grind’ (Anon 1962a: 3). It is evident therefore, that one element of the lectures during this time, highly-prized by those with a responsibility for their production, was the pursuit of enjoyment. Contrasted with rather dry introduction to the Guide Lecturers in the spring 1955 *Bulletin* (see 3.4.3), this shift in tone, some five or so years later, seems in part, to pre-empt the move towards more entertaining, enjoyable and participatory forms of museum education activity that became prevalent in the 1980s and 90s (Hooper-Greenhill 1994; Falk and Dierking 1992). Certainly it represents a sea change from the already cited objective to ensure that children left the Museum ‘a little wiser than they came into it – and with their interest stimulated’ (Science

[67] A programme of Joint-Industrial Lectures emerges at ScM from at least 1959 where they are described as being arranged ‘conjointly with outside industrial and scientific bodies and with visiting specialist lecturers’ (Anon 1959: 2). Evidence from a Schools Notice in February 1977 advertising the ‘Joint-Industrial Lecture-Demonstration – Catastrophic Chemical Reactions in Power Stations for Sixth Formers’ (Science Museum: 1977) to be given by the Research Manager at Central Electricity Research Laboratories, indicates that this type of lecture continued to be available at least until that date. These lectures however, although important to the development of the education provision at the ScM, are viewed as activity that is entirely separate from the work of the Guide Lectures, and therefore do not contribute to the Explainer lineage I construct.

Museum 1955b: 2). This latter attitude of pursuing pleasure alongside instruction also has resonances with Michael Faraday's own beliefs regarding the ways in which audiences should be addressed. Faraday's four letters to his friend Benjamin Abbott (see 2.3.2) in which he articulates his ideas for best approaches to lecturing reveal his understanding of the need for enjoyment throughout the event:

> A flame should be lighted at the commencement and kept alive with unremitting splendour to the end.
>
> (James 1991: 61)

The referred to 'unremitting splendour' may have been difficult to maintain but undoubtedly Faraday's intention was to keep audiences engaged and entertained as they learnt. Notions of entertainment in a museum learning context are not recent advancements yet they continue to be debated in more contemporary contexts (Kidd 2011; Rees Leahy 2011; Falk and Dierking 1997; Hooper-Greenhill 1994). From the middle of the twentieth century onwards this blend has sometimes attracted the unfavourable moniker 'edutainment' due to a perceived privileging of the entertainment elements at the expense of the educational, although the implication in ScM's 1962 text that the 'entertainment' elements will be most strongly felt in the extra-curricular lectures, appears to suggest that the most enjoyable aspects might be reserved for more leisurely pursuits. This 1962 manifesto-like document goes on to suggest that:

> [A] child's first visit (…) at the age of 10, 9, 8, 7 or even 6 years of age should be an exciting and pleasurable adventure (…) After a few visits a Pavlovian conditioned reflex is established and a child's face will light up at the mention of the word Science.
>
> (Anon 1962a: 1-2)

Facilitating a connection between pleasure and science with a view to inspiring further engagement has then been a central aim of ScM's approach to learning for at least the last fifty years and its driving motivations appear to have altered little in that time. The document espouses the view that science museums are needed as one element of a wider societal effort to 'create a huge reservoir of scientific and technological manpower without which it is impossible to run a modern industrial society', once again chiming with early objectives of the RI, and in seeking to stimulate the interests of children from a very early age clearly sees itself as having an important contribution to make to this attempt, an enduring attitude in the present day. Explored in Chapter 5 (5.2.2) is the David Cameron-led Conservative government's prioritisation of STEM subjects as part of a broad plan intended to address a skills gap that it hopes to then harness in order to enable modern Britain to contribute more effectively to the global economy.

The early 1960s were a time of consolidation and reflection for the Lecture Service. In addition to the manifesto-like document, a paper entitled *The Science Museum Lecture Service and Special Services for Children* was also produced, providing a useful insight into both the philosophies behind the provision and the details of the seven different categories of lecture that were available by that time. By then the Lecture Service aimed to 'make the objects in the Museum more intelligible, interesting and meaningful to visitors both casual and in organised parties' (Anon 1960: 1) and in this respect illustrates little significant deviation from the fourth recommendation of the 1911 Bell Report, which had been reprinted in the Programme accompanying the opening of the new galleries on 20 March 1928:

> Objects should be so selected and exhibited as to arouse the interest of members of the general public, and to afford them an opportunity of obtaining at least general ideas on the subjects which the collections illustrate.
>
> (Science Museum 1928: 5-6)

Indeed, arguably the core educational intentions of ScM have altered very little since its inception and the outputs and activities of the Lecture Service and its descendants have only transformed in any substantial degree in response to the fluctuations in trends and tastes for different learning styles. It is apparent that by 1962 the Special Demonstration Lectures had become a regular feature of the Guide Lecturers' repertoire and that these had were presented 'to school children, on the lines of those given at the Royal Institution' (Anon 1960: 1) offers further evidence of ScM's admiration and emulation of the RI's approach.

The seven categories of lecture that by 1960 formed the regular programme were divided into those for school parties and those for the general public and were by far weighted towards events delivered in the Lecture Theatre, with only two of the seven described as 'tours' that took place in the galleries themselves.[68] John Liffen, drafted temporarily into the Lecture Service in 1973, recalls that the Lecturers generally preferred the more predictable nature of Lecture Theatre events and where possible tried to downplay requests for the gallery tours (Liffen: 2014) – raising the question of why this was so? Such preferences chime with the earlier practices of Mr Groom (see 3.4.1) and a possible explanation for this preference may be related to a desired elevation in their own status. The physical space of the lecture theatre would have created a dynamic where audience attention was fully focussed on the lecturer, effectively turning him into an authoritative figure. The gathering of the audience into seated rows would have contributed to this and additionally, enhanced the atmosphere of performance. Current experiences sometimes felt by contemporary SMG Explainers refer to the difficulties of delivering talks and presentations in galleries that can be complicated by the lack of defined space and competing noise from other visitors, and perhaps these were also amongst the concerns of the Guide Lecturers in the 1960s and 1970s. These contemporary observations include:

> We don't have a dedicated gallery/room anywhere…other museums do and it works so much better (…) also wld [sic] be nice to lose the noise from other people/activities in same space. (Exp1/NMeM/15)

> We don't have any dedicated learning spaces. We often run workshops in the picnic area – which is open and the acoustics are terrible. The sound of other groups having their lunches is very distracting for Explainers as well as the people in the workshop. (Exp2/NMeM/15)

This observation from an Explainer who worked at ScM between 2012-2014 is revealing in the context of the issue of delivery space:

> The Lecture Theatre was my favourite place to present (it was very "showy") whereas demonstrations on gallery were slightly more difficult, as I had to compete with the noise of the gallery. (Exp1/SCM/15)

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[68] The seven categories are: Regular Lecture Tours; Regular Theatre Lectures; Request Lecture Tours; Request Theatre Lectures; Special Lectures to Schools; Popular Holiday Lectures; Industrial Lectures. (Anon 1960: 1-2).

This perception that the Lecture Theatre offered a space and experience that was more ‘showy’ chimes with my proposition that the Guide Lecturers enjoyed the audience attention-focussing capacities of the Lecture Theatre and associated status-enhancing opportunities - all eyes would have been on them, without the visual and aural distractions present in the galleries.

This issue was certainly recognised in other parts of the Museum with one document from 1962 referring to the fact that ‘tours and theatre lectures are not normally offered to school parties below the age of 10 as the Children’s Gallery, usually crowded and somewhat noisy, is set out in such a way as to make the services of a guide superfluous’ (Anon 1962a: 5). The 1960 *Bulletin* also depicts an image of densely populated spaces and bustling crowds, which although capturing a thirst for learning, also conveys an atmosphere less ordered and predictable than that which might have been found within the more formal setting of a lecture theatre:

> [T]he prevailing impression nowadays is that of groups of children and grown-ups purposefully marching around in parties, of the doors of the Lecture Theatre bursting open and 100 people pouring out, of eager faces gathered round a bench watching a demonstration of gold beating, or of the Children’s Gallery teaming with boys and girls.
>
> (Science Museum 1960: 3)

Whatever the personal preferences of the Guide Lecturers the visitor attendance figures for 1961 are testimony to the fact that audiences definitely preferred the theatre lectures: 13,525 attended these, compared with 7,811 in attendance for the gallery talks (Anon 1962a: 6). By 1964 the gap between the two was even more striking and an analysis of the lecture attendances that year reveals that Theatre Demonstration Lectures, as they were then called, attracted 23,446 audience members compared with just 4,635 in attendance for the gallery lectures (Science Museum 1964: 23). Again, it is possible that the Guide Lecturers preference for the Theatre Lectures enhanced their delivery style making them more desirable to visitors, but more likely it is the addition of demonstrations, which were not included in the gallery lectures, that accounted for the much higher visitor numbers. Particularly notable here however is that of the 23,446 attending the Theatre Demonstration Lectures, 10,181 were attributed to the Joint-Industrial

Lectures, which were largely delivered by visiting industry practitioners at the invitation of the Lecture Service. The Annual Report for 1964 shows how the figures for the lectures delivered by Guide Lecturers themselves fell sharply from 21,255 in 1963 to 15,971 in 1964, suggesting that one important explanation for this 'general reduction of pressure' (Science Museum 1964: 4) on the Lecture Service is once again due to the competition from science television. Although the Annual Report declares ScM's broad support for this technological development, observing that many of the televised lecture-demonstrations were first devised and performed there, it also recognises the potentially negative impact this has on its own programme and the difficulties, if not impossibilities of attempting to compete with advancements in the new technology of broadcasting. Instead, it suggests that future policy should discard a focus on striving to achieve high visitor attendance figures and rather concentrate on 'devising new lectures with ingenious demonstrations on needed topics for the ultimate benefit, through television, of a mass audience' (Science Museum: 1964). A memo written by Guide Lecturer Major VC Wall to Museum Assistant Mr Chew concerning Wall's plans for his 1964 Easter lecture on the motor car, revealing his desire to borrow Mr Chew's Piezo effect demonstration to give a 'fat juicy spark across a plug' was met with the response:

> The piezoelectric effect demonstration which gives a spark is owned by Mr Chilton. Mine merely causes a lamp to flash.
>
> (Chew: 1964)

The rather dry response conveys something akin to covetousness towards Chilton's perceived superior apparatus and certainly indicates that Chew, and presumably Wall, understood the need for maximum impact and effect on the audience via the demonstrations. ScM's prioritisation of the demonstrations appears to have endured and in 1966 the Lecture Theatre was closed for refurbishment so that the scale and more challenging content of future demonstrations could be secure. Fluctuations in visitor attendances during the following years seem to have coincided with a period of uncertainty in the staffing of the Lecture Service, although they are not necessarily attributed to this and at the end of 1970 the appointment of Mr JD Freeborn as Lecturer, to join Wall introduced a temporary era of stability. The planned-for mass reach through direct links with television appears not to have occurred although the Lecture Service continued to devise new and exciting demonstrations to accompany the lectures, with audience figures rising to 35,963 attending 750 lectures in 1972 (Science Museum: 1972b). The archival evidence indicates that during this period the structure of the Lecture Service was evolving and expanding: the complement of two Lecturers that had been a constant since 1928 rose to three in 1973, and although the role title most frequently used to describe them was by then simply 'Lecturer', use of the original 'Guide Lecturer' still occasionally creeps in to documents such as Advisory Council Reports (Science Museum: 1970).

In 1970 a new role of Education Officer was created and filled by one of the existing Guide Lecturers Mr J Van Riemsdijk, with the specific purpose of developing and increasing the provision of the Lecture Service and in 1973 the Service was brought together with the Circulation Department, Children's Gallery, Audio-Visual Aids and Interpretation Services under the management of one Head. The following year ScM introduced the practice of displaying small demonstrations of skilled craftsmen at work with a series of small events enabling audiences of up to 12 people to watch glass lampworking in operation. In what must presumably be regarded as recognition of the intimate and authentic nature of the activity the Annual Report for 1974 describes it as affording visitors a 'quality of experience that is attainable in no other way' - even the demonstrations of nineteenth-century experiments, however exciting and spectacular, might be viewed as mere reconstructions when considered alongside the *actual* craftsman demonstrating his skill.

The final era of the Lecture Service can be said to have begun in 1976 with the retirement of Major Wall after twenty years as Guide Lecturer. There followed a period made difficult by a lack of lecturing staff, but the appointment at the end of the year of Mr Aubrey Tulley, initially as Research Assistant, and then late in 1977 as Lecturer, saw the establishment of the final cohort of three Guide Lecturers before the Service was to become superseded by a far more interactive and hands-on approach to engaging audiences, ultimately in the form of Launch Pad, explored in the following chapter. The programme appears to have changed very little during the remaining years of the Service with well-liked events such as the Easter and Christmas lectures continuing to feature prominently, the titles, such as the 1978

Easter lecture *Star-Ships, Death Rays and Little Green Men* perhaps reflecting a lighter, more populist approach. Tulley's Christmas Lecture *New Flames for Old* included 'many spectacular demonstrations [which] required special expertise – and unusual heroism – from the Museum Assistants' (Science Museum: 1978) illustrating that the appetite for demonstration had not waned and suggesting that audiences were by then demanding even more exciting and challenging experiences.

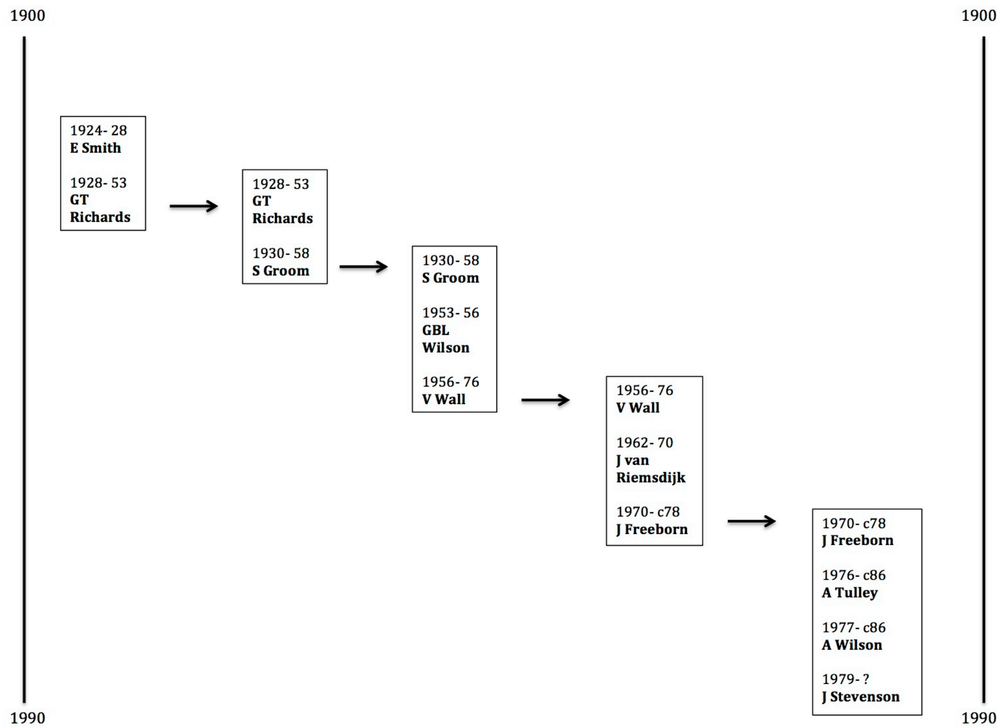
The changes in government in 1979 that saw Margaret Thatcher lead a new Conservative administration brought about the establishment of The Office of Arts and Libraries and ScM was brought within its jurisdiction, ending its association with the Department for Education that had begun around the turn of the century. In a period that was defined by endings and new beginnings, in 1983 the existing Advisory Council published its final report, noting that the Museum had established itself as a significant cultural destination, attracting 3,346,000 visitors in that year alone and that many of these were children. Importantly for this enquiry, it goes on to observe that the 'Museum's concern for them, first expressed by the creation of a Children's Gallery in 1931, has been intensified by the conversion of the former Lecture Service in to an Education Service', highlighting the formal ending of the Museum's first major advance in the construction of live-person explaining as a fundamental element in its education and interpretation approach.

3.6. Considering the key theoretical frameworks

The following sub-sections explore how the overarching theoretical frameworks for the research enhance readings of ScM Guide Lecturer practices in the defined period.

3.6.1. Models of vertical transmission at ScM

In the Chapter 2 (2.3.1) I suggested that a form of vertical transmission existed amongst the scientist-lecturers at the RI, inculcating in that organisation a particular approach to the delivery of lecture-demonstration that endures to the present day. In order to suggest the transmission of those practices to ScM I suggest that it is possible to also explore the inter-relationships of its Guide Lecturers in terms of vertical transmission. Always operating in discrete pairs until 1977 when the number expanded to three, a pattern can be discerned whereby one Guide Lecturer remains following the departure of another. The remaining lecturer can then be seen as the exemplar model for future practice and in this way a transmission of style and approach can be traced through the sixty years or so that the Guide Lecturers were operational. This pattern of transmission can be seen in the diagram (*Figure 3.8*):



(*Figure 3.8)* Vertical transmission of performance practice amongst Guide Lecturers at the ScM 1924-c.1986.

Richards, Groom, Wall and Freeborn are here positioned in the 'master' role, serving to pass on the existing practices as each new Guide Lecturer, the 'disciple', takes up the role. Since, throughout almost fifty of the approximately sixty years of the role's existence just two men worked together at any one time, new recruits would certainly have observed the existing Lecturer at work. Training, such as it was, would likely have taken the form of learning through observations, and understanding from the experience and practice of the more established Lecturer how to capture and hold audience attention. In replicating what they witnessed a standard practice was established and passed on. John Liffen's reminiscences from his time as a Museum Assistant (1973-75) in the Lecture Service support this notion:

> As far as I'm aware the only training was on the job, watching others at first and then gradually easing into the role (…) Their lectures to schools were

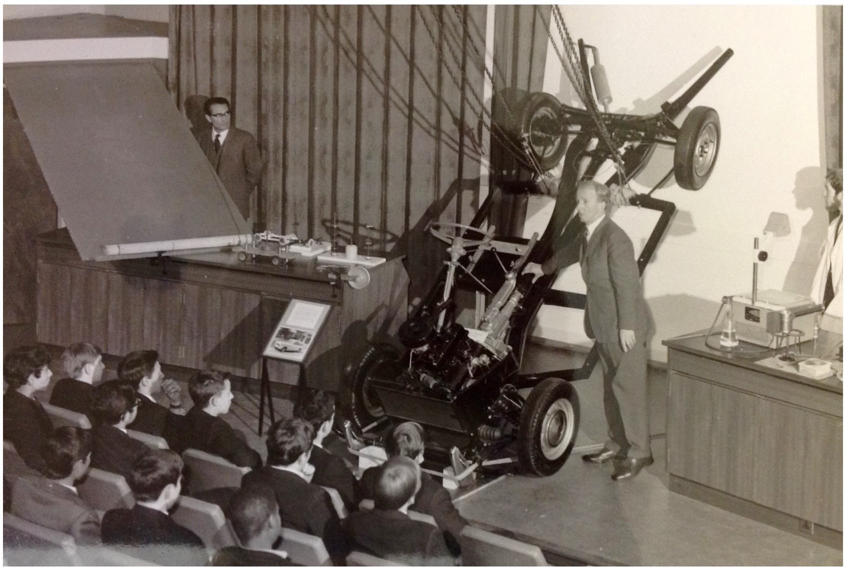
> 'set-pieces' which rarely changed once prepared (…) Generally they followed a standard format for each of their lectures, which they came to know by heart.
>
> (Liffen: 2014)

The Guide Lecturers' routine of watching others before gradually taking on delivery duties recalls the practices in place at the RI in the nineteenth century, and enables a reading of their lecturing practices as a 'physical storyline' (Pitches 2011b: 141) that continued throughout much of the twentieth century. The fact that of the four men I have identified as 'masters', the first three served in the role for extended lengths of time also enhances this idea - they were well practiced, experienced and skilled in their own right and their longevity in the role helped to ensure the long-term continuation of physical practices.[69] Of course, their practices would likely have continuously influenced each other during the regular course of their activities, not only as a matter of training, or learning the role. A photograph of the Christmas Lectures 1963-64 *(Figure 3.9)* reveals how one Guide Lecturer, Mr van Riemsdijk, operated the lighting whilst the other, Major Wall, gave the lecture-demonstration:

(*Figure 3.9*) 'Christmas Lectures 1963-64, *Science by the Fireside*. Mr Wall demonstrating, Mr van Riemsdijk with spotlight'. © *Science Museum/Science & Society Picture Library*

[69] Richards served in the role for 25 years; Groom for 28 years; and Wall for 20 years.

At the time of this photograph *(Figure 3.9)* 'disciple' van Riemsdijk would have been in the role for approximately one year, while 'master' Wall was already in his sixth year as Guide Lecturer. It is impossible to know if activity of this kind was often repeated, especially since there were Museum Assistants who aided the Lecturer with the setting up of demonstration equipment. I was able to locate two further photographs (*Figure 3.10*) that confirm the joint presence of van Riemsdijk and Wall at a lecture-demonstration in 1966, also indicating an interesting model of co-presenting since they both appear to deliver different elements of the same event.



(*Figure 3.10*) Mr van Riemsdijk and Mr Wall presenting a lecture-demonstration in 1966.
© *Science Museum/Science & Society Picture Library.*

It seems plausible, at least, that they may have taken this two-hander approach to special events such as the Christmas Lectures where they would have been keen to create an atmosphere that was even more exciting than usual - the 'jam' (see 3.5). If this were so, then opportunities to watch more experienced Lecturers at work would have been plentiful.

It can be seen then, how a vertical transmission was established amongst the Guide Lecturers that endured until there was a move towards more informal methods of learning in the Museum. In terms of connecting these practices to nineteenth-century methods, specifically those at the RI, and enhancing the Explainer lineage, we must return to the impact of the events in 1954.

3.6.2. Embodied practices and the significance of December 1954

Mr Groom and Mr GBL Wilson were the two Guide Lecturers who, in December 1954, observed Sir Lawrence Bragg's lecture(s) in the lecture theatre at the RI. According to Diana Taylor's concept of the ephemeral repertoire of embodied practice/knowledge (2003: 19), this places them at the knowledge production site and encompasses them in the act of transmission. As previously noted she proposes a new definition of the word 'repertoire' than that more commonly used, and posits that 'repertoire' is an enactment of

> embodied memory: performances, gestures, orality, movement, dance, singing – in short all those acts usually thought of as ephemeral, nonreproducible knowledge.
>
> (Taylor 2003: 20)

Crucially, her assertion that a critical element of repertoire transmission is presence, or 'being there' (Taylor 2003: 20) emphasises that it is the intrinsic interaction between presenter and audience which enables the passing on of practice. The fact that the form of the lecture-demonstrations performed at the RI has altered little in the two hundred years or so since they began (see 2.1.1), suggests that the transmission of its repertoire is strong. Echoing the transmission pattern established at the RI between Davy, Faraday and Tyndall, the definite *physical presence* of Groom and Wilson at the RI lecture-demonstrations for schools in December 1954 affirms the appropriate conditions for the effective transmission of embodied knowledge and practices.[70] In this way it can be said that Groom and Wilson were participating in an experience that incorporated recycled (Carlson: 2003) or restored (Schechner 2006: 29) behaviours from the line of RI scientist-lecturers gone by. Their physical presence enabled the transmission of those past practices to them in the 'here and now' (Taylor 2003: 24).

I suggest that the influence of the RI on the Guide Lecturers was likely further strengthened at a later point in time. In a letter dated 8 March 1957, an individual named SE Janson, the Officer in Charge of the Lecture Service at ScM, writes to Sir Lawrence Bragg on the subject of their shared interest in and commitment to lecture-demonstrations for schools. The letter contains the following request:

> I should be very grateful if our two Guide Lecturers, Mr SH Groom and Major VC Wall, who give our series, could attend one of your series at the Royal Institution. Demonstrations are so perfectly staged and carried out at the Institution that they would profit enormously from such a visit.
>
> (RI MS WLB_90p_17)

Although the Special Demonstration Lectures had been established for almost two years by this time, ScM evidently continued to seek inspiration from the RI. A handwritten note in pencil on the left-hand side of the letter, dated the following day, confirms that Groom had been called by telephone as a follow-up measure. Although I could not locate any further information pertaining to this suggested visit, the warmth with which Bragg had received F Sherwood Taylor's similar request in 1954, and indication of the follow-up phone call, suggests that it is highly likely a visit did occur. Additionally, Janson's letter requests that the Guide Lecturers and also Mr GBL Wilson, by then the Schools Liaison Officer, be allowed to attend some of the RI's meetings with 'science teachers and members of famous research teams (…) [to] enable them to keep in touch with the very latest research and the workers who are doing it' (RI MS WLB_90p_17). A second handwritten note on the left-hand side of the letter, in blue ink, confirms that Major Wall planned to attend a Research Day on 18 March 1957. This congenial exchange

[70] These examples are only those that are I was able to identify. It is possible, perhaps even likely that the Guide Lecturers may have attended other similar public events at the RI out of personal interest.

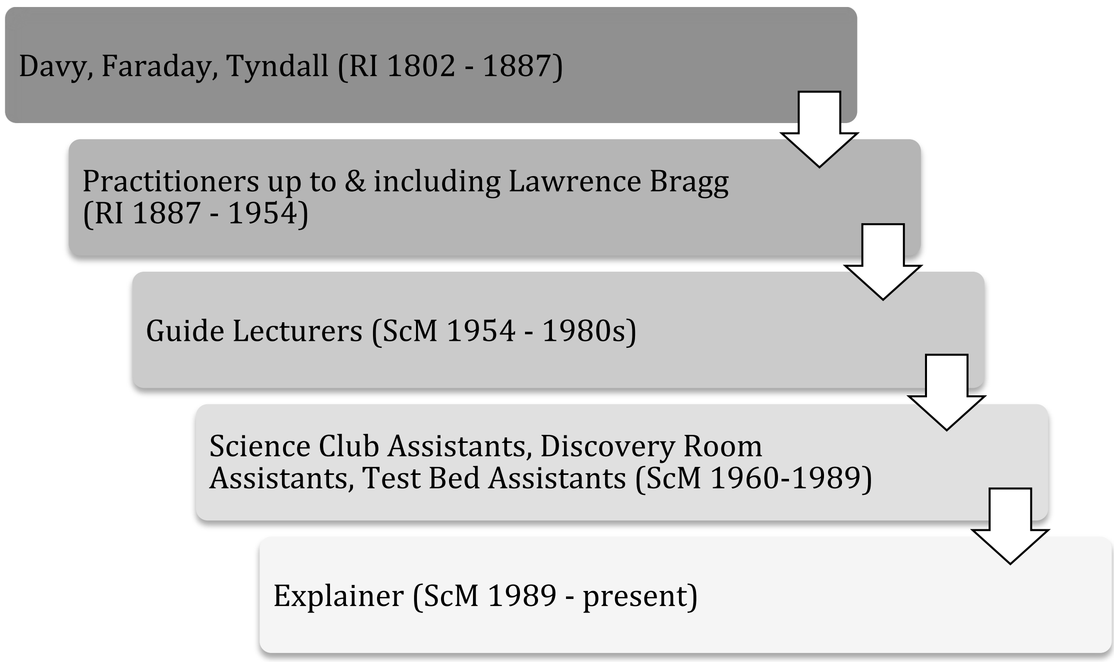
points strongly to good cooperation between the RI and ScM and it is therefore likely that in 1957 Groom encountered a further RI lecture, and Wall, his first. Crucially, this would mean that three of the four 'masters', with responsibility for passing down the existing traditions of ScM lecture-demonstration, had participated in the actual transmission of ephemeral practices at the RI.

In Chapter 2 (2.3.2) I highlighted an early example of the physical transmission of ideas as illustrated in Faraday's own writings. He proposed the re-staging of what he had seen Davy perform at the RI in order to persuade his friend Abbott of a particular opinion, emphasising that 'the performance would give us a clearer idea' (James 1991: 28). The physical presence of Abbott at such an event was critical to Faraday's notion that this would enable him to be influenced by what he had seen. In a similar way, spectatorship by ScM Guide Lecturers of the December 1954 (and probably March 1957) lecture-demonstrations at the RI resulted, I suggest, in the traces of their forms remaining and residing intangibly in the memories and experiences of the Guide Lecturers. These intangible traces then re-appeared as embodied elements in the actual performances of the lecture-demonstrations given at ScM by the Guide Lecturer-observers.

It may be suggested that the performances of lecture-demonstrations at ScM post-December 1954 were also influenced in an intertheatrical (West 2013; Bratton: 2003) sense by those at the RI. It is impossible to know what other kinds of performance experiences the Guide Lecturers might have had and been shaped by, but certainly their encountering of the RI lecture(s) would have enhanced their capacity for making sense of that particular form and increased the likelihood of their being influenced by it in the construction of their own performances. This action of course takes both Bratton and West's theorisation one step further to suggest that the spectator (Guide Lecturer) can be influenced not just in terms of how they might interpret other performance forms, but also in terms of how they might actually *create* those forms themselves. The material evidence in forms such as F Sherwood Taylor's memo to David Follett, the item detailing the Guide Lecturer's December 1954 visit to the RI on the *Actions Arising from Conference of Schoolteachers* document and Janson's letter to Lawrence Bragg point to a deliberate and conscious effort to take inspiration from the RI performance style.

But the Guide Lecturers were also subconsciously taking away with them embodied elements of practices that had been reverberating in the RI's lecture theatre space for the past one hundred and fifty years or so.

As Taylor observes, the 'repertoire (…) allows scholars to trace traditions and influences' (Taylor 2003: 20) and the Guide Lecturers' conscious act of embracing the RI scientists' methods and approaches as such, informs my own construction of the lineage from nineteenth-century scientist lecture-demonstrator to contemporary SMG Explainer. Returning to ScM to continue with their own efforts to explore and communicate the meanings and uses of science to school groups and beyond, the 1954 Guide Lecturers were both consciously and unconsciously contributing to the transmission of rituals and traditions, established elsewhere, that remain extant as an inherent part of its culture. The vertical transmission that existed amongst them facilitated an enduring sense of 'againness' (Taylor 2003: 21) as each new generation appropriated the embodied knowledge. Thus, those earlier RI-infused ScM practices became in turn, part of its traditions of performance, ultimately finding a route towards current iterations of Explainer performance work. This progression, can be represented in diagrammatic terms thus:



(*Figure 3.11)* Diagram showing proposed pattern of vertical transmission from RI practitioners to Explainers

The repeated downwards projection of the arrow represents my proposition that the progression will endure and the lineage will necessarily extend into subsequent iterations of the Explainer role in years to come. In this way I suggest that traces of the lecture-demonstration practices first devised by Humphry Davy and emulated and adapted by other scientist-lecturers at the RI throughout the nineteenth century, will continue to reside in the embodied presentational practices of Explainers within the SMG. The attendance in December 1954, and March 1957 of ScM Guide Lecturers at RI lectures thus established a critical embodied and intertheatrical link in the Explainer lineage that not only brings together two significant public scientific organisations, but also ties popular contemporary explaining practices to a rich tradition of elite lecture-demonstration conventions.

3.7 Conclusion

The period from 1924-1980 encompassed some significant developments in the ways in which ScM attempted to engage younger audiences. The recommendations made by the Bell Report in 1911 were critical in highlighting the need for live-person interpretation, importantly, suggesting that it was activity *within* the galleries that was required. The establishment of the Guide Lecturer role was fundamental to ScM's response to the Bell Report, albeit some twenty-three years later, and the original brief for that role in the guise of Capt. EC Smith, to lead talks and tours within the galleries attempted directly to address its recommendations. The Guide Lecturer role, I have suggested, can be regarded as the prototype for the contemporary SMG Explainer role for the ways in which it represents a model of visitor engagement that operates inside the galleries and amongst the collections, that subsequently expanded to include more consciously performance-based demonstration modes, in this instance in the form of lecture-demonstrations.

As this chapter has shown, the early gallery tours and talks were largely replaced by lecture theatre talks that eventually included demonstrations, and I connect this development to the conscious efforts that were made to emulate practices at the RI. But I also suggest that the physical presence of the Guide Lecturers Groom and Wilson, at the RI lecture(s) given by Lawrence Bragg in December 1954, and also most likely Groom and Wall's presence at the March 1957 RI lectures, facilitated a process of embodied knowledge transmission that enabled them to carry traces of the behaviours they had seen back to ScM. Chapter 5 explores the ways in which these can be seen as a mesh of gestures and recycled behaviours that have restored themselves in various iterations of SMG live-person explaining approaches over the last hundred years or so.

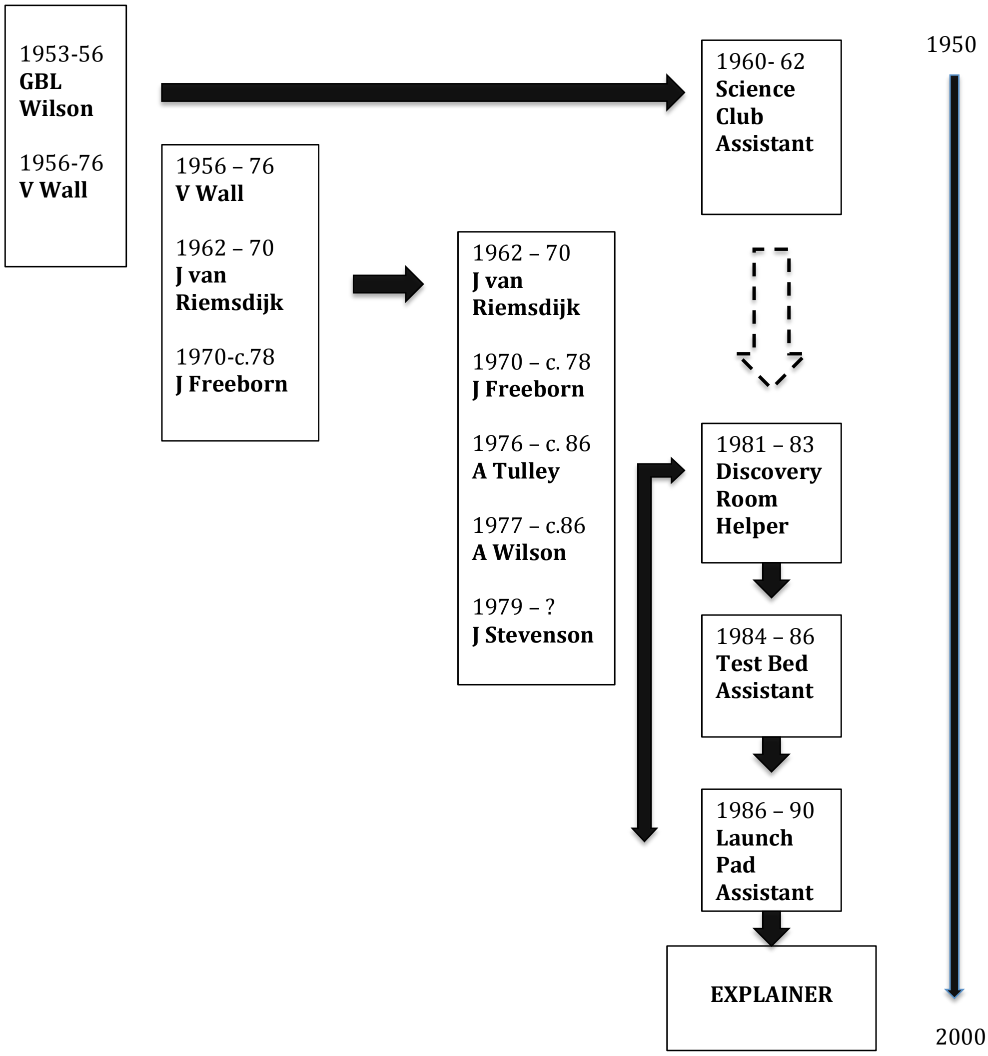
In the next chapter I explore the period at ScM from the early 1980s to the end of the twentieth century focussing on four public-facing roles that I propose form the critical links in the lineage from Guide Lecturer to contemporary SMG Explainer.

Chapter 4

From Demonstration to Participation: the rise of interactivity at ScM (1960-2000)

4. Introduction

The previous chapter focussed on the work of the Guide Lecturers at ScM from 1924-1980, highlighting their significant contribution to the development of its live-person interpretation, particularly in the form of lecture-demonstrations. I positioned the Guide Lecturer role as a critical element in the Explainer lineage that I trace back to the lecture-demonstration scientists at the RI, using unpublished archival sources to show for the first time how the practices at that organisation can be seen as having directly influenced the development of similar practices at ScM. I illustrated how the role can be viewed as an early prototype of the contemporary SMG Explainer. This chapter extends the lineage, exploring the period from the early 1960s-2000 and examining four public engagement/learning roles that evolved during that time as ScM developed a more participatory approach. Following a series of experimental and iterative phases during the 1980s, such an approach eventually culminated, in July 1986, in the opening of the interactive science and technology centre, Launch Pad. The diagram (*Figure 4.1*) illustrates how these four roles can be seen as following on from each other in a vertical sense, as well as showing their horizontal relationship to the Lecturers during the last twenty years or so of the Lecture Service. I revisit this diagram at the end of the chapter to consider the relationships from the perspective of vertical transmission. As discussed later in this chapter (see 4.7), the system of transmission between the four public engagement roles examined here occurs more widely from cohort to cohort, rather than in the strict 'master-disciple' form that is more evident in the nineteenth-century RI (Chapter 2) and ScM Guide Lecturer (Chapter 3) models.



(*Figure 4.1*) Diagram showing the vertical and horizontal relationships between iterative Explainer roles and ScM Lecturers

4.1.1. Chapter rationale

The defined time period (1960-2000) encompasses the four new roles that I suggest contribute to the Explainer lineage and these are explored in varying degrees dependent on the availability of archival evidence. I also consider certain broader events and figures from the mid-1960s onwards in order to highlight certain specific connections and, as I suggest, consequential influences on the development of the Explainer role. These relate specifically to: a) contextualising the development of the modern interactive science and technology centre (ISTC) and a consideration of its roots in North American practices from the late 1960s and b) the activities of ScM's Science Club and the Science Club assistant role (1960-62). In this way the chapter sometimes cuts across time periods rather than following a strictly chronological trajectory. Finally, it considers the ways in which the addition of the four new roles can be understood in terms of vertical transmission (Watson: 2002). The chapter thus comprises four key concerns:

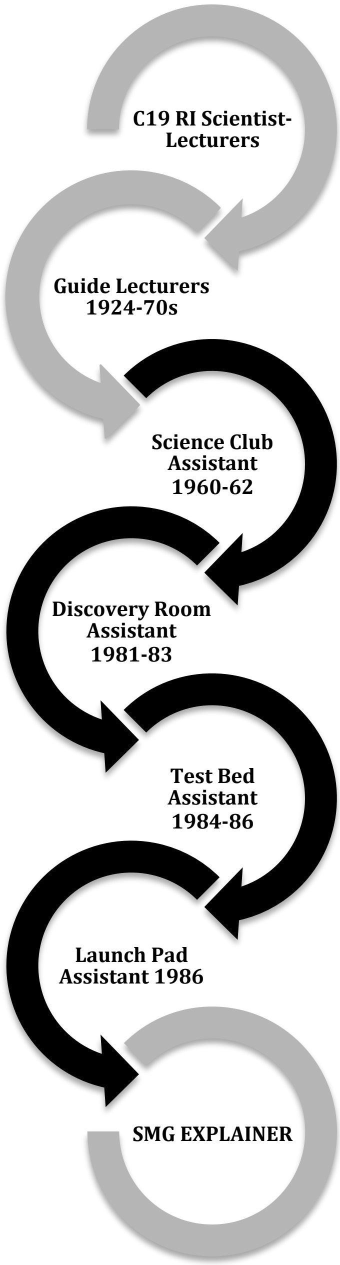
- Establishing the contextual background to the founding and growth of Launch Pad alongside a summary of the ISTC movement and the cultural shifts in public science communication in the UK during the period
- Illustration of a growing trend towards hands-on and participatory audience engagement methods, beginning with ScM Children's Gallery (1931) and culminating in Launch Pad (1986), with a focus on the use of live persons as a means of interpretation
- Exploration of the influence and impact of the San Francisco Exploratorium (1969) and the Ontario Science Circus (1969) on the development of Launch Pad, with particular consideration of how the latter's visit to ScM in 1981 contributed to the development of the Explainer role
- Presentation and assessment of the potential contribution to the development of the Explainer role made by specific education staff in three separate visitor engagement initiatives in the period: the Science Club (1960-62); the roles of 'helpers' (Wilson: undated) in the Discovery Rooms (1981-83) and 'assistants' (Science Museum: 1982) in the Test Beds (1984-86); consideration of these roles as constituent elements of vertical transmission

This chapter's title includes the words 'participation' and 'interactivity'. I use these, and their variants 'participatory' and 'interactive', alongside terms such as 'hands-on' to describe the dominant types of activities and experiences found at ScM during the period. Nina Simon offers what may be seen as the blueprint for contemporary industry understandings of 'participatory' in her highly regarded book *The Participatory Museum* (2004). Here she envisages participation as an experience of networking, sharing, a mixing and re-mixing of ideas and encounters, as a community of visitors and institution staff collaborate and co-create its content and interpretation. Hers is a highly twenty-first-century model that exploits technology and advancements in social media and affords the visitor an active voice in decision-making. My use of the terms participatory/participation places less emphasis on aspects of collaboration and co-curation and relates to the *OED* definition: 'Characterised by, relating to, or involving participation; (of a form of art or entertainment that allows members of the general public to take part'. I use these terms - participatory, participation, hands-on, interactive - broadly interchangeably to mean activities and experiences that enable visitors to be actively involved, to take part and to have space to react or respond. In this way, it is shown how the activities on offer at ScM during the period are distinct from the more didactic approaches evident in the work of the Guide Lecturers.

As in the previous chapter the predominant consideration in this chapter is historical. It addresses all three of the subsidiary research questions in varying degrees, but will particularly examine questions 1, 2 and 3:

1. What does a focused analysis of the role of the Explainer and its antecedents reveal about the historical and cultural development of the SMG?
2. What are the shifting attitudes of the museum industry to the role of the Explainer and its antecedents in the period?
3. How do conceptions of expertise, value and status play out in this sphere?

The diagrammatic representation of how this chapter contributes to determining the lineage of the SMG Explainer can be expanded and the four new roles explored in this chapter following on from the Guide Lecturers can be clearly seen (in black):



(*Figure 4.2*) Representation of Explainer lineage presented in Chapter 4

As with Chapter 3 this chapter draws on a range of published and unpublished archival sources from ScM's Z Archive as well as other reports in the public domain, augmenting these primary sources with a range of literature from the fields of science communication and museum studies. The archival sources include:

- Minutes from the Committee on Provision for Children's Interests at ScM (1955-58)
- A Study of Children's Interests and Comprehension at a Science Museum by Joyce AM Brooks and Philip E Vernon (1955)

- Committee on Provision for Children's Interests at ScM Interim Report (1956)
- ScM Annual Reports (1959-62)
- Various internal memoranda and letters (c.1981-86)
- Evaluation of visit to ScM by the Ontario Science Circus (1981)
- Evaluation of the Discovery Rooms (1981-82)
- Job Vacancy Adverts for Discovery Room Assistant (1982-83)
- Internal Paper giving details of the proposed new science & technology centre at ScM (1983)
- The Educational Role of ScM – NMSI (1983)
- Launch Pad Advisory Panel Meeting Minutes (1984)
- Launch Pad Consultants Panel Meeting Minutes (1984-1985)
- ScM Advisory Council Report (1985)
- Launch Pad Public Information sheet (1985)
- Public Understanding of Science Report (Bodmer) (1985)
- NMSI scrapbook of press cuttings & articles relating to the official opening of Launch Pad (1986)
- Launch Pad Publicity brochure (1986)
- Update internal NMSI newsletters (1989-94)
- The History and Background of Launch Pad by Aubrey Tulley (incomplete PhD draft chapter 1992)
- Science and Society Report (Jenkins) (2000)

Additional primary evidence has been gathered from semi-structured, informal face-to-face and telephone interviews with former ScM employees who bring direct experience of having worked on Launch Pad in either managerial roles and/or as early Explainers during the period, as well as from a specifically-devised online questionnaire completed voluntarily by former and present ScM Explainers via their closed Facebook group. In this way the chapter begins to present aspects of the actual voices of 'proto-Explainers', to be expanded in Chapter 5. The chapter also uses photographs depicting several of the various iterative roles in action, obtained with the help of picture research staff at Blythe House.

4.2 Models of participation and interactivity

The period from the mid-1960s-2000 incorporated several shifts in the ways in which publics understood and engaged with science. As illustrated in the previous chapter, up until the 1980s UK audiences at ScM had largely only been offered opportunities to passively consume science in the form of lecture-demonstrations and talks, but in North America practices had been evolving that gave audiences greater involvement in the process, in the form of the ISTC. There is overwhelming agreement amongst commentators in the field (Short and Weis 2013; Boyle 2010; Boon 2010; Henning 2006; Touza 2002; Cossons 2000; Beetlestone et al 1998; Tilden 1998; Schaffer 1997; Morton 1997; Simmons 1996; Butler 1992; Quin 1990) that the San Francisco Exploratorium founded by Frank Oppenheimer and his wife Jackie in 1969, and to a lesser extent, the Ontario Science Centre, which opened a little later in 1969, characterise the prototypes that formed the bases of all subsequent global ISTC designs and approaches. The Exploratorium is later discussed in more detail (see 4.2.1). Voicing a widely held view Alison Boyle describes the Exploratorium as the 'grand-daddy' (2010: 157) of modern science centres. Some however, (Henning 2006; Caulton 1998; Beetlestone et al 1998; Butler 1992) also suggest that the true roots of the modern science centre can be traced back even further to the working industrial engines at the Deutsches Museum[71] in 1925, the chemical demonstrations performed at the Palais de la Découverte[72] in 1937, the 'Chicago Museum of Science and Industry's simulated coal mine in 1933 and in 1934, a two-storey beating heart that visitors could walk through at the Franklin Institute in Philadelphia' (Caulton 1998: 8). Other scholars go back significantly further. As others have commented (Walton 1998; Rennie and McClafferty 1996), Richard Gregory (writing in 1986) argues that the first notion of an exploratory science centre can be found in Francis Bacon's *The New Atlantis*, posthumously published in 1627, one year after his death, in which Bacon

[71] The Deutsches Museum, Munich was founded in 1903 by Oskar von Miller, although didn't open to the public until 1925, initially as a museum of meteorological instruments, but rapidly became a museum of science and technology and now considered to be the biggest of its kind in the world.

[72] The Palais de la Découverte, Paris, the brainchild of Jean Perrin, Nobel prizewinner for Physics in 1926, was founded in 1937 as part of the *International Exhibition - Art and Technology in Modern Life*. Perrin's overarching aim was to 'manifest the vital role that science has played in creating our civilisation and impart the certainty that we will never discover anything truly new, nothing life-changing, except through research and discovery'.

presents the 'sound-house, where we practice and demonstrate all sounds and their generation' (Walton 1998: 19), implying a method that seeks to enlighten through showing and telling, or encounter. Practical or interactive approaches to the dissemination of science have been present for several hundred years then, but the phenomenon of the modern science centre did not emerge until the second half of the twentieth century.

Others have discussed the educational philosophies and theories bolstering the twentieth-century science and technology centre movement (Beetlestone et al 1998; Rennie and McClafferty 1996; Butler 1992; McManus 1992; Hein 1990), and while it is unnecessary to reiterate them in detail, in order to appropriately situate ScM's expansion of its learning offer in that direction, and more importantly in this context, the development of the Explainer role in relation to it, some reference to them is needed. The following subsections therefore briefly summarise the development of the ISTC and its principal engagement styles, provide a brief account of the growth of the movement and offer a contexualising perspective on the Exploratorium.

4.2.1. The development of the modern interactive science and technology centre (ISTC)

There is an important distinction to note between the science *museum* and the science and technology *centre*. The museum essentially emphasises cultural heritage through the display of objects. Paulette McManus (1992) amongst others (Lindqvist 2000; Butler 1992; Hein 1990) provides a useful précis of the history and development of the modern science museum, moving from seventeenth and eighteenth century European private collections of interesting rarities known as Cabinets of Curiosities, to university-affiliated research-driven institutions, progressing towards the first real public institutions offering authoritative sources of information and finally to those museums with a substantial focus on science and industry that arose from the great public exhibitions and world fairs. The unifying element in all of these is the privileging of display – the preservation and the presentation of collections and objects according to a chosen taxonomy are the principal focus and the visitor's experience is, traditionally, almost entirely visual. The science *centre* however can be seen as a 'decontextualised scattering of interactive exhibits' (McManus 1992: 164) that are intended to encourage the practical and multi-sensorial exploration of scientific and technological concepts, and its principles consciously seek to blend learning with enjoyment. As former ScM Lecturer John Stevenson notes in his PhD thesis exploring the long-term impact of interactive science exhibits, 'the context of the interactive exhibits is an important factor for an ISTC; i.e. its physical setting must be appropriate and the presence of friendly helpers or Explainers is essential' (Stevenson 1993: 26). As a rule ISTCs are not connected to collections, and the majority operate as self-contained or stand-alone centres rather than being housed within an existing museum, aiming to 'both enlighten and entertain through contemporary, participatory exhibits' (Rennie and McClafferty 1996: 54). Launch Pad provides a strong, if rather unusual, example of an ISTC that is part of an established museum but which also has its own separate branding and identity that consciously distances it from the rest of the museum's collections. As an aside, it is interesting that in his *Rationale for a Science Museum* (1968) Frank Oppenheimer laid out the blueprint for an institution that was ultimately to make its name as the definitive modern science *centre*.[73]

Much scholarly activity has been undertaken to explore and evaluate the different learning styles and resultant outcomes associated with interactive, hands-on exhibits (Beetlestone et al 1998; Walton 1998; Rennie and McClafferty 1996; McManus 1992). Rennie and McClafferty highlight the distinction between these two terms, even though, as they point out, both publics and professionals often use them interchangeably. They suggest the following definitions:

> Hands-on exhibits require some physical involvement of the visitor with the exhibit [...] the exhibit is passive. Interactive exhibits are those which respond to action from the visitor and also invite a further response.
>
> (Rennie and McClafferty 1996: 58)

So while a hands-on exhibit is passive and an interactive exhibit is reactive both invite participation, requiring a choice to engage on the part of the visitor, and as Beetlestone et al observe 'if the visitor is not fully engaged then the result is

[73] Oppenheimer combines the terms just once in the Rationale when he refers to the 'science museum and exploration center' (Hein 1990:218), although the laboratory-style atmosphere to which he aspires is clearly evoked in his descriptions.

diminished' (1998:7). The fundamental emphasis with both is placed upon the need for the visitor to do more than simply look or listen, and often there is the inclusion of some form live-person encounter:

> A hands-on or interactive museum exhibit has clear educational objectives which *encourage individuals or groups of people working together* to understand real objects or real phenomena through physical exploration which involves choice and initiative. (my italics)
>
> (Caulton 1998:2)

These fundamental principles underline the approaches that shaped the ways in which ScM engaged audiences in the latter part of the twentieth century.

4.2.2 Locating the ISTC: some late-twentieth-century contexts

Frank Oppenheimer published *A Rationale for a Science Museum* (1968) just one year before he opened the Exploratorium, in it laying out his vision for an organising strategy that offered five key areas for visitor exploration based on the psychology of perception: hearing; vision, taste and smell; tactile sensations, and proprio-sensitive controls (physical aspects that govern balance, locomotion and manipulation) (Hein 1990:218). His fundamental belief in an exhibition style that engages people via the senses stemmed from a combination of his own upbringing and the hands-on, experiential approach he honed as a classroom teacher in the 1950s (Hein 1990).[74] The dramatic shift away from the long-established museum philosophy that focused on a collections-dominated and reverential 'look but don't touch' approach to exhibition is palpable in Oppenheimer's concept, and whilst familiar to audiences now, represented something rather revolutionary in 1968. Indeed, for most UK audiences it was still somewhat revolutionary in July 1986 when Launch Pad opened to the public at ScM becoming the first permanent and purpose-built ISTC in the country. Only two other similar UK initiatives existed at that time: Techniquest in Cardiff, founded by Professor John Beetlestone, opened its doors in November 1986; and the Exploratory in Bristol, founded by Richard Gregory which had been organising temporary and touring exhibitions since

[74] Oppenheimer's father was a gentle and cultivated businessman, his mother an artist, and he was raised with an appreciation that art, like science, is a way of perceiving the world and finding order in it. As a schoolteacher he frequently led field trips and scavenging missions, taking back to the classroom a treasure-trove of objects that could be used to augment his teaching. (Hein 1990: 7,12).

September 1984 but did not locate to a permanent residence until February 1987. ScM envisaged playing a 'coordinating role in the establishment of Interactive Exhibit Centres throughout the country' noting that it saw this role 'as one in which [it would] act as an exchange for ideas and experience, helping to avoid duplication of effort and ensuring that funds are used to maximum advantage' (Wilson: 1983a) although in practice, this appears not to have occurred.[75] It could be argued that the direct and hands-on approach to visitor engagement and science communication that is now an integral aspect of SMG Explainer work owes much to the success of Oppenheimer's vision. As I showed in Chapter 3 an important version of live-person engagement had however already begun to take root there via the Guide Lecturer role, and, as will be illustrated later (see 4.4, 4.6.1, 4.6.2), subsequent ScM initiatives also reveal an intuitive and innovative attitude to engagement.

Walton (1998) has identified that there is not one single model that can adequately describe learning methods in ISTCs and this diversity in approach is an important aspect of their development. Oppenheimer's introduction of a progressive approach to learning that focused on sensory perception and experiential learning encompassed his belief that effective explanation of scientific and technological concepts was dependent upon the use of props. His 1968 *Rationale for a Science Museum* is unequivocal on this:

> Explaining science and technology without props can resemble an attempt to tell what it is like to swim without ever letting a person near the water. For many people science is incomprehensible and technology frightening. They perceive these as separate worlds that are harsh, fantastic and hostile to humanity.
>
> There is thus a growing need for an environment in which people can become familiar with the details of science and technology and begin to gain some understanding by controlling and watching the behavior of

[75] Head of Education Anthony Wilson's internal report also refers to previous unsuccessful attempts to gain support for an interactive centre in the Blythe Road building in 1980, and again in 1982. The 'funds' referred to were to come from one of the Sainsbury family charities that had agreed to provide seed capital for 5 or 6 ventures similar to Launchpad around the county in the wake of the successful funding bids of £350,000 from the Department of Trade and Industry for building costs, and £350,000 from the Trust to staff the research component of the Launch Pad project.

> laboratory apparatus and machinery; such a place can arouse their latent curiosity and can provide at least partial answers.
>
> (Hein 1990: 217-8)

His central premise is concerned with organising exhibits according to scientific concept so that the visitor is able, indeed encouraged to find their own pathway through them, but with the assistance of signposts in the form of thematically arranged interactives to help guide them. The intention is that the visitor is enabled to explore the same scientific phenomenon from various different perspectives, thus increasing their prospects of greater overall understanding. Labels describing how to use the exhibits as well as posing questions that are intended to provoke the visitor into connecting the exhibit with its associated scientific concept or usage are placed on or alongside the exhibit itself. The other innovation introduced by Oppenheimer at the Exploratorium, and of critical importance to this study, is the role of 'Explainers', highlighted in section (4.5).

It is evident that in the twenty years or so following the opening of the Exploratorium something of a global boom in ISTCs occurred, beginning in North America and expanding particularly across Europe. Richard Walton's 1998 survey lists 33 centres in the UK, 31 in Scandinavia, 12 in Spain, 10 in the Netherlands and 6 in France, in addition to several hundred in the United States. In 2015 the number of centres affiliated to the UK Association for Science and Discovery Centres was 67 (ASDC: 2015), over double the number in existence just eighteen years earlier – these figures suggesting that the boom persists. This boom is significant since it affirms the popularity of a wide range of models of science communication that promote engagement and interactivity, and in the case of ScM itself, the use of Explainers. A significant element of the success of this type of model is the connection between interactivity and fun. As Caulton observes:

> The underpinning philosophy of interactive exhibitions is that visitors find hands-on exhibits more absorbing and enjoyable than static exhibits in traditional museums and this is demonstrated both by the number of people visiting hands-on centres and by their responses when they are there.
>
> (Caulton 1998: 13)

The ISTC lies somewhere between informal learning establishment and tourist attraction and as such must take seriously the need to facilitate learning as well as to entertain its visitors. Critics have observed that the bringing together of these two elements in this context often results in the 'entertainment dimension [being] more successful than the educational one' (Rennie and McClafferty 1996: 55) and such an approach has led to use of the somewhat pejorative term 'edutainment' (see 3.5). In his book *Fantasy City*, exploring the notion of the post-industrialist city as an entertainment hub, John Hannigan (1998: 99) observes that the San Francisco Exploratorium was the trailblazer for embracing edutainment principles amongst science centres and museums, before concluding that economics are likely to be the one obstacle to them becoming 'full-scale entertainment destinations' (1998: 100). Indeed, following the permanent closure of Launch Pad in November 2015, which had always been free entry, it was announced that its replacement, a new interactive gallery opening in late 2016 and costing £4m to develop (Fulcher: 2014), will engage 'visitors in the drama and spectacle of maths and science' (Science Museum: 2015b). Using watchwords such as 'drama and spectacle' point to ScM's ambition for 'entertainment' on some large scale, but one that will inevitably come at a price for although it will 'remain free for schools to support curriculum-focused teaching' (Science Museum: 2015c), all other visitors will be charged for admission. It remains to be seen then, whether Hannigan's prediction that this development is likely to result in failure comes true. Arguably, in any event, those charged with planning and delivering education programmes would likely contest a shift towards 'full-scale' entertainment, but nevertheless interactive science centres need to continue to find methods that maintain a balance between enjoyment and instruction and it is in this context that some of the more recent Explainer outputs can be viewed.

4.3 Public engagement with science (1981- 2000)

This section explores the specific conditions in the UK that provide the background to ScM's change in approach from didactic lecture-demonstration style delivery, to a more hands-on, participatory experience for visitors. It reviews the broader decisions that were made about science engagement with the public before exploring some of the ways in which these impacted on ScM. Although still some years behind the progress made in North America, as this section illustrates, ScM established a place for itself that was ahead of developments in the UK.

4.3.1. The UK landscape: impact of the *Bodmer Report* (1985) and the *Science and Society Report* (2000)

The contemporary umbrella term 'science communication' incorporates the wide variety of methods used to share scientific knowledge with non-expert publics and from the early 2000s onwards its UK focus has been on visible and concerted efforts towards public engagement. This was not always the case and as previously articulated (3.1), the UK lagged behind the pioneering developments in North America that began in the late 1960s and actively promoted the use of experiential approaches to science learning and engagement in the form of ISTCs. Contemporary views of how UK scientists and science communicators should present their work within the public domain have been shaped by over thirty years of analysis and review, with two notable reports offering considerable contribution to the debates: *The Public Understanding of Science* (1985), instigated by the Royal Society and also known as the *Bodmer Report*, and the *Science and Society Report* (2000) commissioned by the House of Lords.

Prepared under the chairmanship of Sir Walter Bodmer, a Professor of Genetics, the *Bodmer Report* highlighted the need 'for an overall awareness of the nature of science, and, more particularly, of the way science and technology pervade modern life' (Royal Society: 1985).[76] Claiming the issue to be of relevance to both individuals and the nation as a whole, the Preface presented its perceived need:

[76] The other ten members of the committee were appointed on an *ad hoc* basis and included Sir David Attenborough and Dame Margaret Weston, then Director of the ScM.

> More than ever, people need some understanding of science, whether they are involved in decision-making at a national or local level, in managing industrial companies, in skilled or semi-skilled employment, in voting as private citizens or in making a wide range of personal decisions.
>
> (Royal Society 1985:5)

The focus in *Bodmer* on the usefulness of science to both industry and more domestic practices once again recalls the mission statement of the RI, laid out almost two hundred years earlier, that sought to explore 'the application of science to the common purposes of life' (James 2000:3)(see 2.2.2), and also the current ScM mission that aims to 'make sense of the science that shapes our lives, help create a scientifically literate society and inspire the next generation' (Science Museum Group 2013: 3). Seemingly little of significance has changed in terms of the broader intended impact of these institutions over extensive periods of time, although methods used by ScM have certainly altered.

The *Bodmer Report* claims that a robust economy is heavily dependent upon a robust manufacturing industry built on science and technology, and that public disinterest in or indifference to this weakens a nation's industrial and technological production and consequently its global status. It is regarded as essential for the benefit of the country then, that its publics take notice of scientific developments. These recurring attempts to stimulate public interest in exploiting science and technology as a tool for national advancement can be viewed as efforts to build in future generations, who will inevitably bear the responsibility for ensuring continued national and economic growth, the foundations of life-long scientific and technological enquiry that will facilitate this. ScM refers to this as its aim to develop a 'scientifically literate society' and in its most crude form is the fundamental concern that drives all its outputs and activities, including those of Explainers.

Steve Miller (2001) briefly sketches the landscape of the UK public science story post-World War II, suggesting that it 'showed periods of great adulation and expectation immediately after the war, followed by disappointment and even hostility, giving way to a generally ambiguous viewpoint' (Miller 2001: 115). He highlights how the *Bodmer Report* legitimised the mass popularisation of science in the UK. Indeed, in a sort of mobilising rally cry its concluding recommendation advises, ‘our most direct and urgent message must be to the scientists themselves: Learn to communicate with the public, be willing to do so and consider it your duty to do so’ (Royal Society: 1985), apparently holding them responsible for previous lack of success in communicating with publics. Scientists and science organisations appeared to heed this call and, amongst other outcomes, one result stemming from the *Bodmer Report* was the founding of the Committee on the Public Understanding of Science (CoPUS), a group comprising representatives from the British Association for the Advancement of Science, the Royal Society and the RI, which established various initiatives designed to promote awareness and understanding amongst the public. CoPUS was however, relatively short-lived and disbanded in 2002 in the wake of a second influential report in 2000, the *Science and Society Report* (Science and Technology Committee: 2000) commissioned by the House of Lords, which saw attitudes to science communication shift once again.

A significant criticism of the *Bodmer Report's* approach and recommendations concerned the reliance on what came to be known as the ‘deficit model’, a model that, as various commentators have pointed out (Short and Weis 2013; Burall 2011; Miller 2001; Macdonald 1996), was widely discredited.[77] This model favoured a ‘one-way, top-down communication process, in which scientists—with all the required information—filled the knowledge vacuum in the scientifically illiterate general public as they saw fit’ (Miller 2001: 116). The central problem with the model was that simply providing people with greater amounts of information did not necessarily lead them to change their understanding of, and attitudes towards science. Although public interest in science and technology endured – evidenced, for example, by the *Science and Society Report's* findings that data from broadcast media such as the BBC’s science output was deemed to be at

[77] The principle recommendations of the *Bodmer Report* in summary are: proper science education at school should be available for all up to age 16, with post-16 education including a balance of arts and science; the Parliamentary and Scientific Committee could be more effective in disseminating popular versions of government reports; there is scope for more science in the media, particularly broadcast media and daily newspapers, and contact between scientists and journalists could be improved; British industries should be more active in promoting their interests in science and informing the public of their work; scientists must learn how to communicate better with the public; the Royal Society should prioritise improving public understanding of science. (Royal Society 1985: 6). The emphasis in these recommendations on simply providing more information is clear.

an all time high, and a flourishing trade in popular books on science also confirmed high levels of interest – there was mistrust and scepticism towards scientists themselves and an overall lack of clarity concerning how individuals may be affected by issues.[78] The fundamental message that emerged from the *Science and Society Report* was that a much greater emphasis on dialogue with the public was needed. The often condescending, authoritative approaches sometimes adopted prior to the report, and seemingly advocated by post-*Bodmer* strategy, needed replacing with open and transparent attempts to engage the public in discussion and debate. The 2000 report observes that the expectation of the public at the time was 'not merely to know what is going on, but to be consulted' (Science and Technology Committee 2000: 5.1), or as Miller puts it, 'while scientists may have scientific facts at their disposal, the members of the public concerned have local knowledge and an understanding of, and personal interest in, the problems to be solved' (Miller 2001:117). He concludes that the time was right for science to properly move from the safety of the laboratory and engage more openly with communities.

In his 1986 Bernal Lecture at Birkbeck College, Bodmer recognised a philosophical and cultural view of science exploration suggesting that 'science is a major part of our culture and there is therefore an argument for pursuing science simply for its own sake' (Bodmer 1986: 5). His Lecture depicts the role of the scientist as analogous with the role of the composer or musician and as such, Bodmer effectively places the public in the role of passive *audience*, deriving pleasure and enjoyment merely from the act of listening: 'People may enjoy the excitement of being told about scientific advancements even if they are not themselves scientists' (Bodmer 1986: 5). In a challenge to this perception, suggesting a subtle repositioning of the public as presented in Bodmer's 1986 lecture, Beetlestone et al augment the status of the public so that they have a more participatory role:

> Viewing science as part of culture, and the public as citizens with whom to enter into the dialogue, we must exploit the communication media best suited to such meeting places and such forms of dialogue.
>
> (Beetlestone et al 1998: 21)

[78] The report highlighted a range of reasons behind the public's mistrust of scientists and their practices, including the BSE crisis, issues surrounding vivisection and a perception that science was a difficult area, pursued by unimaginative people.

The shifting of the role of the public's engagement with science can be illustrated thus:

(*Figure 4.3*) Diagram showing shifts in the role of the public

In highlighting this redefinition of the public's role I emphasise the implied necessary changes in conditions for the engagement of audiences and the impact this had on the methods used for communicating science. Audiences are re-defined from passive, 'being told' about science and its advances by the scientists, to active, 'enter[ing] into a dialogue' with them. The debates concerning how this should be done and subsequent recognition of the need for greater inclusion and participation ultimately allowed for more innovative forms of audience engagement. Writing in 1998 Beetlestone et al identify some of these alternative forms of communication as being: interactive software, face-to-face encounters with scientists and, importantly in this context, science theatre

It was within this context of more open engagement with the public that ScM began to take steps towards developing its own methods of enhancing its delivery of person-based interpretation and effecting a shift from simply assisting visitors in the galleries and providing them with lecture theatre talks and demonstrations, to drawing them in using more entertaining and actively participatory methods. In fact, as will be shown, ScM was a little ahead of the findings of both Reports. The result, experimental during the early 1980s and then fully implemented via the Launch Pad gallery in 1986, was an expansion in the uses of live persons within the galleries to assist interpretation and explain the science and stories behind objects and concepts in increasingly informal, interactive and ultimately performance-centred ways.

4.3.2. Initial responses at ScM

It is difficult to assess how deliberately or consciously ScM responded to these messages of the need for increased openness with the public. Initiatives there, beginning in 1981, some four years before publication of the *Bodmer Report*, in the form of the Discovery Room, began to experiment with approaches that encouraged visitors to interact with exhibits, supported by 'assistants' as necessary. This activity is explored later in the chapter (4.6.1). In July 1986 ScM opened Launch Pad, its purpose-built interactive gallery designed to enable visitors to engage in an active, physical manner with a large number of exhibits and in ways that would be specific and personal to them. As with the Discovery Room, here ScM had assistants, later known as 'Explainers' on hand to help people, activity that later developed into much more actively performance-based. A former Explainer and interactive galleries manager (MGR1/SCM/15) who began working in the team in 1988, remaining there in a range of learning-orientated roles until 2013, suggests that the practice of using more performance-related strategies evolved in response to the inclinations of the people employed as Explainers at the time. At the beginning of MGR1/SCM/15's employment it was evident that there was little conscious intention to use formal or pre-planned live interpretive activity as a means of open engagement of visitors:

> They weren't called 'Explainers' then, they were called 'gallery assistants', so we wore white lab coats, there was a team, a small team that worked on the gallery and I had no training, no briefing, absolutely nothing, I just said 'what am I supposed to do?' And they said 'just staff the gallery, there's going to be children in here in a minute'. I had no idea what Launch Pad was. (MGR1/SCM/15)

They describe how during the earlier days (late 1980s) the gallery assistants' primary responsibility was to maintain the hands-on exhibits and 'just wander round and talk to the kids' (MGR1/SCM/15). The image of an early iteration of Launch Pad (*Figure 4.4*) gives a good impression of the unstructured approach taken by the assistants and supports the view of them simply being present to chat with visitors and to help as needed.

(*Figure 4.4*) Second iteration of Launch Pad on ScM first floor c.1988/9. The assistant is visible to the left of the image in the white coat, talking with a member of the public. © *Science Museum/Science & Society Picture Library*

When practices began to be more formalised it appears that this move largely connected with attempts to systematise and clarify procedures rather than consciously to engage audiences:

> Then lots of things started to change really, not just at the museum, but across the science communication field, you had British Interactive Group, we became professional as a team of Explainers rather than as I said, you know, temps coming in from nowhere (*laughs*), no safety, no child [protection], absolutely nothing. (MGR1/SCM/15).

Nevertheless, against this context of increased professionalisation the people employed as Explainers began to change the nature of the ways in which they worked:

> Assistants were pretty much there to…in a supervisory role, and I mean supervisory in terms of running the gallery, keeping order with the children, because it was always over-booked and you couldn't come in without a booking so it was to manage that operation. But their primary purpose certainly wasn't to explain the science or to do informal learning the way that we think about it now. That evolved from the type of people that

> formed the team, so when I first started there were a few people with science backgrounds, but there were quite a few extrovert people and they started to create the role in terms of doing performances and briefings on the gallery, they'd talk to children – it evolved from the practice. (MGR1/SCM/15).

This gradual shift at ScM was, according to MGR1/SCM/15, happening some time during the years 1988-1990. Just a few years earlier, at the time of *Bodmer's* observations (1985), the notion of a science *centre* was a relatively new concept in the UK. Indeed, the *Bodmer Report* recognises the advanced progression in this area made in North America, commending the pioneering work of both the San Francisco and also the Ontario Science Centre. Noting also that museums in the UK could play a major role in establishing a similar hands-on approach, such a move would surely augment the role of the public from audience to participant. It is an interesting paradox that in spite of the top-down approach to building public awareness of science in the years preceding the *Science and Society Report*, the perception of ISTCs as effective new places for public scientific engagement was already on the rise, almost as though the anti-deficit-model reaction had begun to take hold immediately in the wake of the *Bodmer Report*. This is evidenced in MGR1/SCM/15's comments above concerning the development in the late 1980s of more participatory forms of visitor/public engagement. In this sense, the *Science and Society Report* merely served to confirm what many of those engaged in science communication, including those at ScM, had already worked out for themselves, largely inspired by the success of the aforementioned models and others from overseas. MGR1/SCM/15's observations support this view, confirming a direct influence from North American models:

> Before Launch Pad, the Ontario Science Circus had been resident in the museum, in 1981 I think, because them and the Exploratorium were the leaders in those days, but that had been hugely successful, the Circus and the shows and all of that stuff, and they put Launch Pad together after that experience, and yeah, they definitely would have gone, I mean so many people from the Museum have gone on tours of America so they would've done Ontario, Boston and Exploratorium certainly. (MGR1/SCM/15)

Former ScM lecturer Aubrey Tulley's unfinished and unpublished PhD chapter *An Informal History of Launch Pad* (1984: 7) confirms that such visits were made, highlighting how, in the original bid for funding from the Leverhulme Trust financial provision had been made for Launch Pad project staff to undertake research visits to some of the prominent science centres and museums in North America, Canada and Australia. Education staff Anthony Wilson, John Stevenson and Tulley himself all made separate trips to various institutions including: the Exploratorium; Ontario Science Centre; Boston Science Museum; and Questacon, Canberra in the period April-July 1984. It is inevitable then that ScM practices in the early 1980s were influenced by the successful and well-established practices from North America, definitely in terms of interactive exhibit design and likely also in terms of person-based interpretation strategies (these influences are explored later in the chapter (4.5)). However, well before the founding of places such as the Exploratorium and the Ontario Science Centre, ScM itself had already taken an innovative approach to gallery interaction through the establishment of the Children's Gallery in 1931. The next section explores how practices there may be seen as having in fact, inspired Oppenheimer in his own endeavours towards interactivity, and more critically, how a role emerges in the 1960s, the Science Club Assistant, that I suggest can be viewed as an indirect, but pre-emptive iteration of the Explainer role.

4.4. The Children's Gallery: early interactivity at ScM

ScM's Children's Gallery with its handful of push-button exhibits, pulleys and dioramas, ground-breaking and enormously successful in its time (Bunney: 2010) must, by the time of *Bodmer* in 1985, and indeed even by the mid-1960s, have appeared rather outmoded and not fully able to meet the demands of contemporary audiences bringing broader experiences and higher expectations. Despite this Stella Butler (1992) suggests that when Frank Oppenheimer toured Europe in 1965 visiting various European science museums including the Deutsches Museum in Munich and the Palais de la Découverte in Paris, he was in particular 'greatly impressed' (1992: 78) by what he encountered in the Children's Gallery at ScM, becoming convinced of the need to bring the same accessibility and understanding of science and technology through the physical experience of exhibits to America. Hein describes this urge as Oppenheimer seeking to establish a museum that would 'testify to the excitement of the activity of science and teach people to take part in it' (1990:6). She also highlights Oppenheimer's frequent visits to ScM during his 1965 visit, but in overtly highlighting the impact of the Children's Gallery on Oppenheimer's vision, Butler makes a firm connection between the creation of the world's first modern and most influential interactive science centre, and the ScM initiative that predates it by almost forty years.

It is somewhat paradoxical then that in the same year that Oppenheimer was introducing his new paradigm-shifting Exploratorium to San Francisco and the world, ScM was re-introducing its newly relocated Children's Gallery to its London visitors, and although it appears that little effort had been made to radically update and modernise the content, and it was presented 'more or less in its original form, the press notice announced the new red, pink and orange walls' (Bunney 2010: 199). Having (perhaps) been partly responsible for inspiring Oppenheimer's visionary approach (Butler 1992), these cosmetic attempts to revitalise and modernise the Children's Gallery must have appeared rather naïve. Nevertheless, despite this arguably outmoded approach to presenting technology to the public, Anna Bunney (2010), amongst others (Nielsen 2014; Boyle 2010; Caulton 1998; Quin 1990; Follett 1978) also highlights the success of the Children's Gallery in both its old and new iterations. Additionally, she credits the 'influence of the child visitor' (2010: 207), never originally intended as a prime audience target, with helping to shape the progress of ScM towards interactivity and experiential visitor engagement. Indeed, accounts of the development of the Children's Gallery (Nielsen 2014; Bunney 2010; Follett 1978) generally accept that it came into being in 1931 as a means of providing an alternative destination for the growing numbers of unaccompanied children who were perceived of as becoming a nuisance and a distraction to adult visitors elsewhere in the Museum. The original location of the Gallery in the basement of the East Block that had been formally opened to the public in 1928 meant that children could be encouraged to be physically separate to a large extent from the rest of the Museum. In reality, the Children's Gallery was as attractive to adults as it was to children.[79] Its use of

[79] Research conducted in 1955 by Joyce Brooks under the supervision of Professor Philip Vernon, Birkbeck College and Institute of Education, University of London, revealed that, much to the surprise of ScM staff, adult visitors normally exceeded children. It found that children were only in a majority on weekdays of holiday periods, and that although many adults were accompanying children, an 'appreciable portion' came on their own. *A Study of Children's Interests and Comprehension at a Science Museum* by Joyce AM Brooks and Philip E Vernon (1955: 178).

dioramas and illuminated transparencies, life-size models depicting a flint-tool worker, a potter and a smith at work, as well as an artificial rainbow and an exhibit of pulleys and jacks (*Figure 4.5*) that visitors could manipulate to demonstrate the impact of forces, quickly made the Gallery the starting point for many visitors seeking an introduction to the principles on display in many of the exhibits elsewhere in the Museum. The Children's Gallery is of particular significance to this research since its early approach to interactivity fostered the spirit of innovation and participation in certain members of staff who worked within it, as is explored later in this section.

(*Figure 4.5*) Children using the pulley interactive in the Children's Gallery c.1950. © *Science Museum/Science & Society Picture Library*

Aubrey Tulley (1993: 1) traces the roots of an interactive science centre at ScM to autumn 1978 when Anthony Wilson, then the Education Officer, proposed an 'Experiment Hall' as one of several suggested uses for the newly acquired site Blythe House. In the event, the proposal was shelved against a background of financial cut-backs that saw the site being used for storage purposes only, but that it was even proposed indicates a spirit of innovation and advancement. I propose, however, that a direct root of the interactive centre Launch Pad at ScM can be traced back further still, to the 1958 'Science Room' first suggested in 1956 by GBL Wilson, one of the Guide Lecturers discussed in Chapter 3 (3.4.3).

The 1956 *Interim Report by the Committee of Provision for Children's Interests in the Science Museum* observed that many of the children questioned for an educational study undertaken by Professor Philip Vernon of Birkbeck College, and more particularly by one of his students Joyce A.M. Brooks, expressed difficulty in understanding the labels in the Children's Gallery. This led to the Committee's recommendation that careful consideration be given to the need for someone to be 'constantly available' (Anon 1956:4) to assist children with understanding.[80] Although this appears not to have happened immediately, there was a subsidiary development that is of significance here. Former Guide Lecturer GBL Wilson had by this time been given a particular responsibility for schools' provision as part of his duties and in 1956 had conducted some of his own research into possible improvements to the Children's Gallery. One of his recommendations was that 'a section of the Gallery might be set aside for demonstrations by the Museum Assistant of special experiments in which children could participate' (Anon 1958: 2). It was agreed by the Committee, although not until 1958, some two years after Wilson's research, that although this seemed an excellent idea it would be preferable to situate such an area away from the Children's Gallery and to 'restrict admission where necessary'. Thus it was decided that such a 'Science Room' as they called it, would be established 'for an experimental period [and] only be used by parties of school-children in the company of their teachers' (Anon 1958: 2). I was unable to establish whether the implementation of the Science Room actually occurred but archival references to a Science *Club* show that *this* particular activity commenced in February 1960, taking place in the Club Room adjacent to the Children's Gallery. Based on the evidence it is my speculative proposal that the Club most likely developed from Wilson's ideas and the discussions relating the Science Room. In Chapter 3 (3.4.3) I emphasised elements of Wilson's own creativity and taste for innovation as evidenced during his lectures, and thus it

[80] The Committee was formed in 1951 at the request of the Director F Sherwood Taylor, to consider generally the Museum's provision for children and whether any changes to the existing provision needed to be made.

would be unsurprising that the first suggestion of an experimental and participatory approach to engaging audiences should perhaps, have come from him. Wilson thus provides an important potential link between the Lecture Service and the hands-on, experiential encounters offered by the contemporary SMG Explainer. This tantalising step in the Explainer lineage that can be connected to the Children's Gallery merits further exploration since it presents the possibility that at the same time as the Guide Lecturers were still operational, and some twenty years in advance of the Discovery Room, ScM was experimenting with small-scale hands-on demonstrations for children, conducted by someone in a facilitative, 'assistant'-type role.

It appears that the Children's Gallery was for many years unstaffed, but as Kristian Nielsen observes in his article exploring curating and visiting in the Children's Gallery up to 1969, an authoritative figure eventually appeared:

> Mr Wheatland, a museum assistant who in 1957 (…) asked to be transferred to the [Children's] Gallery [and] was well liked by the children – some referred to him as "Uncle Ken"
>
> (Nielsen 2014: 534)

Wheatland's role can be seen as marking a shift towards a more structured attempt to actively facilitate engagement. Nielsen also refers to the association made by the Advisory Council in 1965 between Wheatland's work and an increase in the number of school parties regularly visiting the Museum. A document from January 1962 entitled *Services Available to the Public* describes the Science Club development:

> A Science Club for Children, of limited membership, for children between 8 and 15 years of age, meets every Saturday morning from 11am – 12.30pm in the Club Room adjoining the Children's Gallery. Here they work on 'projects', handle and operate a wide range of Museum material and are given lessons on simple scientific and technical matters.
>
> (Anon 1962b: 2)

As previously noted, references to the Science Club can be found in the *Annual Report for 1960* where it is reported that the Club met for the first time in February of that year. Further scrutiny of the available archival sources provides helpful clues to build a bigger picture of the significance of the Club. A paper from November 1959 entitled *The Science Museum lecture services and special services for children* begins with a list of five ‘Children’s Activities’. The intended audience for, and author of this document are unclear although from its tone it is likely that it was designed as some form of promotional material. It is also highly likely that it was authored by GBL Wilson, since in 1959 he was designated schools liaison officer, and had, as noted, since 1956 been assigned to the Children’s Gallery (Nielsen 2014: 532). Several versions over numerous years of virtually the same document were located in the Z Archive (Anon 1959; Anon 1960; Anon 1962c). Of note is that an additional sixth activity describing the Science Club appears in the 1960 version, but in January 1962 it is struck through by hand, suggesting that the Club ceased to be available by then. The first activity on the list describes the presence of ‘a Museum Assistant in the Children’s Gallery who answers children’s questions and helps them on their visits’, likely to be Mr Wheatland, and the fifth refers to one of the Museum’s Officers as being ‘designated Schools Liaison Officer, who deals with this side of the Museum’s activities and is also in charge of the Children’s Gallery’ (Anon 1959: 1), presumably GBL Wilson. Both the *Annual Reports* for 1959 and 1962 refer to the fact that Mr Wheatland had been ‘assiduously cultivating’ (Science Museum: 1959) relationships with as many schoolteachers and parties as possible and ‘making them feel that the Children’s Gallery belongs to them’ (Science Museum: 1962). Finally, the 1961 *Annual Report* mentions the Science Club that was ‘organised by the School Liaison Officer in the Children’s Gallery’ (Science Museum: 1961). From this evidence, I suggest then, that Wilson, as the Schools Liaison Officer and also Museum Assistant with responsibility for the Children’s Gallery capitalised on his prior experience of performing lecture-demonstrations for school groups as a Guide Lecturer, and established the Science Club in order to continue to present demonstrations. The introduction of handling sessions coincides with Wilson’s enthusiasm for new, experimental experiences (see 3.4.3). The Club atmosphere would have been on a much smaller-scale and more intimate than the lectures, and taking place as it did, in close proximity to the Gallery and collections, can be viewed as a pre-cursor to the sorts of activities undertaken by contemporary Explainers. In this way, GBL Wilson provides a fascinating and critical link in the Explainer lineage. He had direct experience of witnessing the RI lectures in 1954 (see 3.4.2), of performing demonstration-lectures at ScM from 1954-56, and he (probably) instigated a more informal, gallery-centred, hands-on approach to engaging young audiences. He was most likely supported by Wheatland in the activity of providing explanatory support in the Children's Gallery and overseeing handling sessions in the Science Club.

Both Wheatland, and more particularly GBL Wilson can then be regarded as having provided a facilitative role, elements of which can still be found in the contemporary SMG Explainer role in Launch Pad, for instance, by simply being available in the Gallery to provide a welcoming presence and to answer visitors' questions. Additionally, and of even greater significance here, Wilson was directly offering children hands-on experiences with 'Museum material' via the Science Club between 1960 and 1962. A purely speculative tangential additional thought occurs here: it is unlikely that Frank Oppenheimer would have actually witnessed the activities of the Science Club in action when he visited the Children's Gallery in 1965 since it seems to have ended in 1962. However, perhaps he might have encountered Wilson there and heard directly from him about his progressive efforts to engage and inspire young visitors. Wilson certainly worked at ScM until 1973 and so would have been present at that time.[81] In this way not only would Oppenheimer's Exploratorium have been shaped in some way by the Children's Gallery (Butler 1992) but perhaps his Explainer model was partly influenced by the assistant overseeing the handling activities of the Science Club too.

Whatever the potential impact on Oppenheimer, it is evident that some form of supervised interactive science handling activity occurred for several years at ScM in the early 1960s. Despite increasing levels of action and interactivity in the work of the Guide Lecturers (3.4.3) these values appear to have lain largely dormant at ScM from then until the emergence of the experimental Discovery Rooms of 1981-83. One possible explanation is that Wilson, having been promoted to Deputy Keeper, took with him the drive for innovative hands-on experiences and thus these did not emerge again at ScM until conditions were right some twenty years later.

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[81] Wilson's name appears on the audit of 'Senior Staff at ScM, 1893-2000' (Morrison 2010: 328) having reached his highest rank of Deputy Keeper when he left in 1973.

4.5 External influences: the impact of the Ontario Science Circus (1981)

This section explores an event that can be seen as being important to the development of the Explainer role. For eleven days in June 1981 the Ontario Science Circus - the touring component of the Ontario Science Centre - visited the UK, dividing its time between a shopping centre in Birmingham and ScM in London, a tour that, as Caulton (1998) notes, was financially supported by the Science and Engineering Research Council. The visit to ScM was to have a significant impact on the development of the Explainer role. The section also briefly considers some of the similarities between the ScM role and the Explainer role at the Exploratorium.

Shortly after the 1981 visit of the Ontario Science Circus Anthony Wilson and Pam Gillies, in an undated draft of an evaluative report entitled *Participatory Exhibits: is fun educational?* measured its impact in terms of identifying 'such information as might be of value in assessing the need for a permanent science centre in this country' (Gillies and Wilson undated: 3). Evidence here then, of ScM already considering such a venture.[82] As might perhaps be expected from an activity that calls itself a 'circus', the group's main stated objective was to enable visitors to 'have fun while they are rediscovering science' (Gillies and Wilson undated: 3) and it is evident from the paper's conclusions that this was achieved, the emphasis on fun being a repetitious theme throughout. Indeed, citing Canadian Museum Studies scholar B.J. Soren (1991), Rennie and McClafferty describe the approach at the Ontario Science Centre as having 'shied away from instructional objectives, favouring development of hot ideas into visual magnets' (Rennie and McClafferty 1996: 55) and point to a range of sources highlighting the difficulties of avoiding visitors simply *playing* with exhibits, essentially suggesting that the inherent conflict apparent in 'edutainment' had here been firmly settled by entertainment. Wilson and Gillies observe that the Science Circus' own Education Officer declared its overriding aim to be 'the promotion of enjoyment and interest' – education was considered very much a 'spin-off' (Gillies and Wilson undated: 1). Their evaluation concludes with the recommendation to 'vigorously support the development of the Science Centre concept in Britain', further concrete evidence of ScM's visionary

[82] The report was drawn from evaluation of the 11-day visit to ScM in June 1981, and was subsequently published in *Museums Journal* 82 (December 1982).

approach and anticipation of both the *Bodmer* and *Science and Society Report* recommendations, previously discussed (4.3.1). Further evidence too, of the fact that ScM's plans for an interactive centre of its own were long in the making. Of greatest interest here is the brief reference made in the draft report to the members of staff delivering the Circus activities:

> As in Canada, the Circus was accompanied by staff members from the Science Centre. These 'hosts' were available at all times to answer questions, give demonstrations, maintain the exhibits and spur visitors to ask questions.
>
> (Gillies and Wilson undated: 3)

Butler (1992) offers further clarification of the Ontario Science Centre 'host' role:

> 'Hosts' are available to explain exhibits further or to help visitors use the various devices; they also provide a programme of small demonstrations of various kinds at regular intervals throughout the day (...) Presentations like this bring the Centre to life, adding a sense of excitement and a lively human feel to the exhibitions.
>
> (Butler 1992: 86)

She also notes that, as with those selected to work as Explainers at the Exploratorium, the 'hosts' were usually 14-18 year old college students. Hilde Hein's definitive ten-year research project (1990) written from the perspective of one embedded in the associated processes and personalities, charts the progress of the Exploratorium from its conceptual roots to world-leading institution. She cites Oppenheimer's 1965 experience of witnessing the 'college students who demonstrated exhibits' (Hein 1990: 135) at the Palais de la Découverte at work as being particularly influential in his subsequent move to introduce large numbers of young people – more than forty in the first year alone - welcoming visitors and engaging them in a wide range of demonstrations amongst the interactive exhibits.

While it has been argued that the presence of a mediator between the exhibit and the visitor compromises the purity of the experience, the use of a person in this context is more usually regarded as contributing to increased engagement for the visitor on a variety of levels and principally in terms of enjoyment and understanding.[83] Rennie and McClafferty identify the pedagogic function of the Explainer role, however it is variously titled, as helping 'visitors focus on the appropriate use of exhibits and to answer questions about their operation' (1996: 76) before suggesting six general perceptions of the role identified by both Explainers themselves and visitors with whom they have interacted, three of which are of significance here:[84]

- Visitors come to interactive science centres to have fun
- An Explainer's role is not to teach – but instead to facilitate understanding of the exhibits
- Learning occurs when visitors are able to connect experiences from the science centre with those from their lives outside

(Rennie and McClafferty 1996: 77)

The intrinsic function of the Explainer role in each of the above perceptions is *facilitative* – to make it easier for visitors to: enjoy themselves; to comprehend; and to be able to make connections between the subject material and their own real-life encounters. Explainers do this in a variety of ways but there is consensus amongst commentators that the prized skills of an Explainer are personal qualities such as enthusiasm, friendliness, the ability to engage with people of all ages and get them talking while keeping the atmosphere enjoyable and unintimidating (Beetlestone et al 1998; Caulton 1998; Butler 1992). Hein observes that Exploratorium Explainers had to be 'talkers, because the most important part of their job was to approach people and engage them in conversation about the exhibits' (Hein 1990: 136). The central linking theme here is an emphasis on a range of communicative skills that would directly map onto successful implementation of the three perceptions identified above. In terms of how these relate to practices at ScM, these qualities were also amongst those sought when recruiting for the role of assistants in the Discovery Room in 1982 and 1983. The

[83] Walton (1998:30) cites the example of the Barcelona Science Museum, which has eschewed the use of an Explainer-type role on the grounds of both experiential and financial cost.

[84] The remaining three are: Learning is not the driving purpose of the visit; Analogies are helpful elements of exhibit explanation; Incidental learning, unrelated to the purpose of the exhibit often occurs.

advertisement for summer vacation work used during both these periods lists the necessary qualifications as:

> Basic knowledge and understanding of elementary science, and the *ability to explain things clearly and simply*
>
> Some practical experience and ability to enable him/her to carry out maintenance on the exhibits
>
> The *ability to talk to a wide range of people with warmth and enthusiasm* but *without being obtrusive*
>
> Reliable time-keeping, *patience* and stamina
>
> (Science Museum: 1982 (My italics))

It is clear from this job advert that by the time of the second Discovery Room at ScM in summer 1982, the Science Circus 'host' role had influenced the type of person desired to assist in it. It is notable too that although not explicitly stating an aim to recruit a student to the role of assistant, the Discovery Room job ad nevertheless makes prominent use of the words 'Vacation Work' in the top right hand corner, suggesting that university students on holiday would be the most likely target audience. MGR1/SCM/15, a former manager of the Explainer team, supports this view, observing that during their early employment (late 1980s) it was common practice to advertise for Explainers by posting adverts on the noticeboards of the various university science departments in close proximity to ScM. I suggest that this practice was initiated when recruiting assistants for the Discovery Room vacation work.

It seems likely that Education staff at ScM recognised the usefulness and potential of the 'hosts' and wanted to provide something similar for their own audiences, reflected in the desirable qualities for the assistant sought by ScM: the ability to explain things clearly and simply; the ability to carry out maintenance on the exhibits; the ability to talk to a wide range of people. The first Discovery Room occurred just a few weeks after the 1981 Science Circus visit, giving ScM the opportunity to begin to shape the outline of its version of the role, and in doing so, unconsciously sketch out an early design for the contemporary Explainer.

That the visit by the Ontario Science Circus to ScM contributed to enthusiasm for the development of Launch Pad is not a new observation and others have made this connection (Boon 2010; Caulton 1998; Rennie and McClafferty 1996; Butler 1992). Indeed, in an internal paper entitled *Science/Technology Centre at the Science Museum – Exhibits etc* which sets out the proposed aims and exhibits, Section 2 on 'Style' states:

> The Director has suggested that the Centre should combine the best features of the Exploratorium and the Ontario Science Circus (not Science Centre) with some new features of our own.
>
> (Wilson undated: 1)

A connection that has not previously been explicitly made however is the likely influence of the Ontario Science Circus host role on the development of the SMG Explainer role. The timing of the first ever Discovery Room swiftly following the Circus visit to ScM, and the subsequent introduction of a role that mirrored the host role are unlikely to be wholly coincidental. Since I am positioning the Discovery Room assistant role as an intrinsic element in the SMG Explainer lineage it can be said that in this way one external influence on the contemporary role can be found in the Circus host role.

4.6 Establishing a modern interactive approach at ScM (1981-2000)

The following subsections explore the initiatives undertaken by ScM as it developed its own approach to increased visitor participation and more interactive methods of engaging audiences, leading ultimately to the establishment of Launch Pad. There were two clear stages of progression leading up to this: the Discovery Rooms (1981-1983) and the Test Beds (1984-1986). Each honed its use of facilitative roles in what can be regarded as iterative phases of the contemporary SMG Explainer role.

4.6.1.Discovery Rooms: experiments with interactivity (1981-83)

This section assesses the contribution to the development of the Explainer role made by the members of staff working in a public engagement role in the Discovery Room. The original motivation for the Discovery Room, located in

Gallery 4 on the ground floor, was a 'modest but genuine gesture' (Stevenson undated: 1) in response to 1981 being the United Nations International Year of Disabled Persons and the intention was to provide a range of participatory and explorative opportunities accessible to all. It also provided an alternative to the more formal lecture-demonstrations that had been the predominant output of the Lecture, and then Education Service since the 1950s (see Chapter 3). An internal report highlights some of the aims:

> In place of our usual summer holiday lectures (the ones with lots of demonstrations) we thought how marvellous it would be to have a Discovery Room (…) We wished our visitors, of all ages and backgrounds, to touch, study and investigate a variety of things and phenomena relating to the Museum's permanent but untouchable gallery displays.
>
> (Stevenson undated: 1)

This description of an experiential, hands-on initiative is illustrative of an approach that apparently bypassed the top-down recommendations of *Bodmer*, which did not exist until two years after the fourth and final Discovery Room, and at the same time pre-empted the recommendations of the *Science and Society Report* that followed fifteen years after that. The introduction of the Discovery Room can then be seen to provide the isolation of the moment when the shift away from the more didactic lecture-demonstrations towards interactivity began. It is significant that in the above report extract the Discovery Room *replaces* the 'usual summer holiday lectures' and that by this time even the lure of 'lots of demonstrations' is not considered likely to be an adequate and exciting enough draw for audiences. Viewed in this context the success of the Discovery Rooms can be seen as ultimately having led to the establishment of ScM's own interactive science centre, Launch Pad in 1986, just one year after the *Bodmer Report* was published. The contribution that the assistant role made to the success of the Discovery Rooms represented a fundamental shift in the ways in which ScM made use of live persons to engage the public - radically different from presenting lectures with demonstrations, but not so far removed from the Science Club assistant of the early 1960s. The notion of experiential, hands-on approaches that had seemingly lain dormant for almost twenty years since the Science Club ended appears to have been resurrected through this initiative. The *Advisory Council Annual Report for 1983* notes:

> For the last three years the Service has run a 'Discovery Room' for schoolchildren during the summer holidays (and again at Christmas this year). A range of exhibits of a participatory nature has provided an introduction to basic scientific principles. The popularity of this venture, and of the visit by the Ontario Science Circus in 1982 (*sic*), has strengthened our conviction that a permanent exhibition with a similar 'science centre' approach should be incorporated in the Museum, where it would play an important role in attracting younger visitors to the sciences and their technological application.[85]
>
> (Science Museum 1983*:* 3)

This section of the *Report* is important for several reasons. It confirms the appeal and success of the Discovery Room, as well as highlighting its intended purpose, which notably had very quickly moved on from being driven by accessibility agendas and is here represented as having far more in common with the enduring science communication theme of understanding science and technology and their impact on our lives. Perhaps more usefully however, it links the 1981 visit made to ScM by the Ontario Science Circus with the driving ambition to establish a science centre of its own. Indeed, the *Annual Report* goes on to announce that the 'necessary sponsorship has now been obtained to carry out such a project, which is to be named 'Launchpad'. Thus the security of the project's development was established some two years before the *Bodmer Report* identified the role museums could play in helping to create a hands-on approach to science (Tress: 1983).[86]

A variety of sources from the Z Archive make clear the fresh approach to engaging visitors that was employed in the Discovery Room. These sources include:

- job advertisements for Assistants for the 1982 and 1983 vacations
- John Stevenson's brief unpublished report on the 1981/2 Discovery Rooms
- Aubrey Tulley's uncompleted and unpublished PhD thesis chapter documenting an informal history of Launchpad

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[85] The Report inaccurately states the year of the Ontario Science Circus visit as 1982, not 1981.

[86] Director of the Leverhulme Trust Ronald C Tress' letter to Margaret Weston (22nd November 1983) confirms the offer to fund the Launch Pad project £350,000 over three years.

- an unpublished report from 1983 by Anthony Wilson, Head of Education, entitled *Science/Technology Centre at the Science Museum*

The common theme emerging from this documentation is one of an informal atmosphere where visitors could touch exhibits and investigate ideas and scientific concepts for themselves, but with the 'essential ingredient' (Stevenson undated: 1) of the presence of members of the Education Staff. Stevenson's report observes that having two members of staff - an Education Officer and a temporary assistant employed specifically for the purpose - available in the Discovery Room was 'essential for the success of the activity. They were able to provide a welcome for visitors, to talk to them, encourage them to interact with and understand the exhibits, and provide running maintenance' (Undated: 1). Of course this was not the first time ScM had made use of people to support visitor engagement. There were the Guide Lecturers, but more closely related, and perhaps, as I have suggested, providing a tangible link between *that* role and the Discovery Room assistant, was the Museum Assistant assigned to the Children's Gallery.

Stevenson's Discovery Room report paints an illuminating picture of the types of exhibits that were on offer and details practical activities that would not look out of place in many ISTCs today: a dustbin filled with a mix of water and a high concentrate of washing up liquid coupled with wire frames to enable visitors to investigate soap films and bubbles; a large magnet accompanied by a range of different metals; containers whose contents had to be identified only by smell (Stevenson undated: 1). (*Figure 4.6*) shows the first iteration of the Discovery Room in 1981.

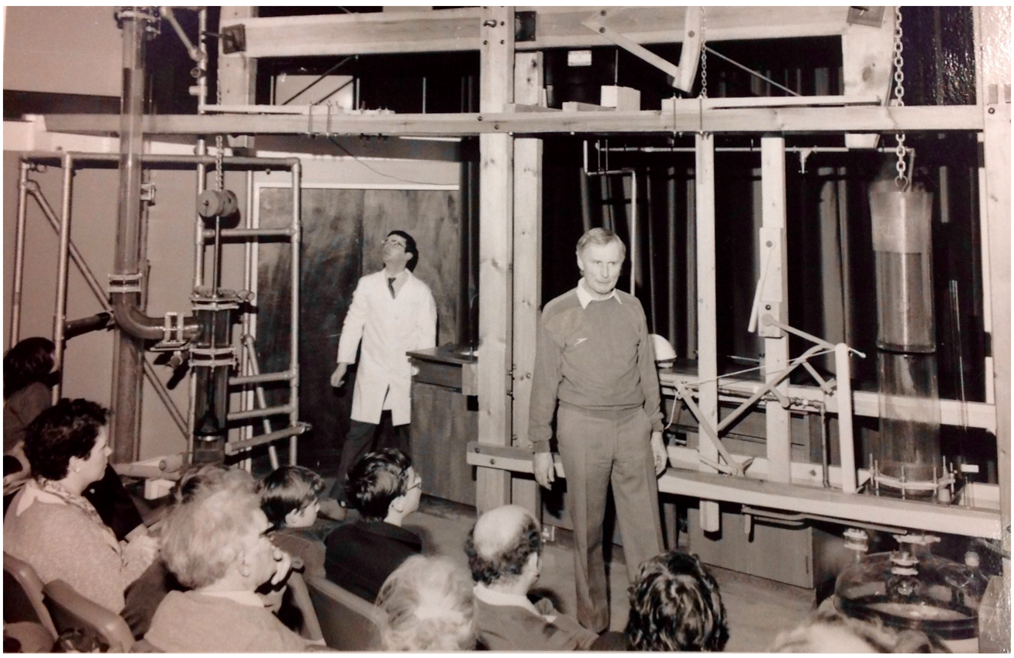
(*Figure 4.6*) Visitors exploring activities in the Discovery Room 1981 © *Science Museum/Science & Society Picture Library*

The short-term location of the Discovery Room is evident with the paintings on the walls clearly visible behind the temporary screens. Also clear (*Figure 4.6*) is the previously described bubbles activity, and although there is no sign of an assistant in this image, it is not difficult to envisage how they may have been on hand, observing visitors and waiting for the opportunity to step in and explain how or why something worked as it did. These simple ideas, the multi-sensory nature of which echoes Oppenheimer's kinaesthetic philosophy, would doubtless have seemed exciting and unusual to UK audiences in the early 1980s, and indeed, Stevenson's report indicates that visitors were delighted by what they found, with 98% of the 156 families questioned agreeing that the Discovery Room should become a permanent addition to the Museum. While his report does not evaluate the effectiveness of the Assistants beyond the observation noted above that they were essential to the success of the project, it is assumed that they must have played a critical role in demonstrating how to use the exhibits and helping to encourage a shedding of inhibition amongst visitors unused to engaging in such a publicly playful way. Stevenson notes that adults in particular 'frequently needed encouragement to break normal Museum behaviour rules – such as "do not touch"' (Stevenson undated: 2) and it is certain that the assistants would have played an active role in providing this encouragement – the job advert states that one function of the role was to 'talk to visitors, encourage them to try things' (Science Museum: 1982). All of these elements recall the perceptions of Explainers identified in Rennie and McClafferty's study (1996:77) and previously noted (4.5), confirming the pedagogic value of the assistant role in the Discovery Room.

In an unpublished letter to Jamie Bell of the Ontario Science Centre, Anthony Wilson, then Education Officer at ScM, expresses his gratitude for the successful visit made by staff from the Ontario Science Circus in June 1981. The letter provides valuable evidence pointing to the foundations of these potential shifting approaches to visitor engagement, and Wilson refers to the 'impact which the Circus has made on the views and attitudes of a number of my colleagues here' (Wilson: 1981). Although, as previously described, the Discovery Room initiative at ScM was instigated in response to the UN International Year of Disabled Persons, the letter, dated 22 August 1981, makes clear that the very first attempt at providing the facility occurred *after* the Science Circus visit: ' Our own experiences in running a small scale "Discovery Room" this month have shown how strenuous the task of staffing such an operation can be' (Wilson: 1981). The alluded to 'impact' of change in attitude among certain ScM staff, coupled with a highly successful experience of a visiting innovative, hands-on science encounter must have been instrumental in bringing about support for the Discovery Room pilot, and subsequently for the establishment of Launch Pad. Significantly, a document entitled *Educational Role of the Science Museum*, written by Anthony Wilson on 19th August 1983, and summarising the background for the plans to 'establish a Centre for Interactive Exhibits at South Kensington' highlights the apparent elevation in status of the Discovery Room from a modest but genuine attempt to be more visitor inclusive, to the pre-cursor of the interactive centre itself:

> As a pilot for the main scheme we are again running a temporary small-scale interactive exhibit centre, called "Discovery Room", in one of our galleries until 31 August.
>
> (Wilson 1983a: 1)

The Discovery Room was then, by now being positioned as part of a larger ambition to bring interactivity to the heart of the educational culture at ScM. Further evidence in support of this idea is found in another document also authored by Anthony Wilson, in which he states the aims and intended style of the envisaged science centre, observing that 'so far as general ambience is concerned, the "Discovery Room" currently running in Gallery 4 gives a fair indication of what I have in mind' (Wilson undated: 2). In this sense the Discovery Rooms can be viewed as having become consciously embedded by those responsible for creating Launch Pad within the embryonic stages of its development. It was never openly intended thus, although it is possible to imagine that forward-thinking staff such as Anthony Wilson, John Stevenson and Aubrey Tulley, who would later find himself drafted in as Secretary for the Launch Pad Project Advisory Panel, harboured plans for an interactive science centre within the Museum long before it actually emerged, and were perhaps simply waiting for the appropriate moment to instigate it. It may be suggested that Tulley would have been aware of the impact and popularity of GBL Wilson's 1960-62 Science Club, and having previously been a Lecturer himself he certainly would have understood the value of practical demonstration. The images (*Figure 4.7*) of Tulley delivering a ScM lecture-demonstration clearly depict his taste for physical and participatory experiences.



(*Figure 4.7*) Aubrey Tulley delivering a lecture-demonstration at ScM (date unknown, c.1976-86). © *Science Museum/Science & Society Picture Library*

As asserted by the former Explainer manager (MGR1/SCM/15), Tulley, whose role had clearly evolved into something rather different from the Lecturer role he had begun with, had a far more involved role in the development of Launch Pad than simply project secretary:

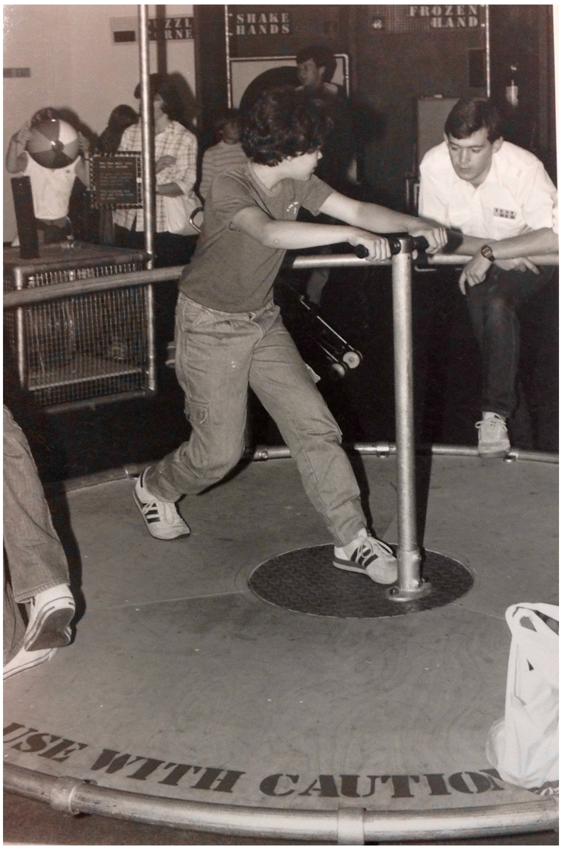
> Aubrey Tulley who was one of the exhibition specialists, he was I would say, one of the biggest influences on Launch Pad in terms of how he designed exhibits. He was a research fellow there and I used to host him coming in, he used to do the evaluation of the exhibits and I got a lot of I would say Launch Pad's spirit from talking to him, he was a charming, charming man (…) and he just had that wonderful gift of coming up with all of Launch Pad's original exhibits, they weren't copies from the Exploratorium, they were Aubrey's ideas pretty much, quite a magical kind of approach to things. (MGR1/SCM/15)

These observations reveal that Tulley had a passionate and imaginative interest in ensuring that a hands-on approach was eventually established at ScM. Whether or not this was the furtive, early intention of certain members of the Education staff when the Discovery Rooms were introduced they provide a strong link in the chain of approaches to interactivity, and more crucially to this research, the assistants who worked in them provide a further important step in the lineage of the contemporary SMG Explainer.

It could not be established from the available archival evidence if an external temporary assistant was appointed for the original Room. John Stevenson's short report on the 1981 and '82 Rooms refers to there being 'two members of staff' available at all times during the opening hours of 11am – 4pm, but later goes on to highlight the 'very great' (Stevenson undated: 1) cost in terms of Education Staff time for actually running them. His report concludes with a brief précis of the 1982 project and the observation that they had been fortunate in being able to employ 'two part-time assistants to help us man the room' (Stevenson undated: 3). It seems highly likely then, that in its first iteration in 1981 the Museum simply used two of its own Education Staff to provide support and facilitation in the Room. Just a year later, having felt the significant impact of a loss of staff time and learnt lessons from both their own practical running experiences and the visit of the Ontario Science Circus, who brought with them their 'hosts', ScM had come to understand the value of introducing a role that was specifically and entirely dedicated to working with the public in an interpretative and facilitative way. In this way, the Discovery Room assistant role is intrinsically linked to the on-going development of the Explainer role and moreover can be said to have contributed to changing attitudes in ScM regarding the ways in which they wanted to use live persons to interpret their themes and objects. The function and use of the Discovery Room assistants thus provides an important link in the Explainer lineage, offering in many ways, the first iteration of a model that most closely resembles the Explainer role of today.

4.6.2. From assistants to Explainers: the development of Launch Pad as a new interactive gallery

This chapter has so far focussed on a range of progressive developments during the latter part of the twentieth century in the uses of people to assist visitors in their engagement with increasingly interactive exhibits in science museums and centres. I have suggested that ScM's own approach during the early 1980s was influenced, with varying degrees of consciousness, by both the broader global shifts towards interactivity particularly exemplified by the Exploratorium, and also by the visit of the Ontario Science Circus. In addition, I propse that an even earlier paving of the way for more active and informal visitor engagement occurred from 1960-62 in the form of the Science Club that was run alongside the Children's Gallery, offering visitors opportunities for hands-on and demonstrative experiences. In the final section of this chapter I will explore how the role of members of staff, known initially as 'assistants' or 'helpers' in the Test Beds, and then ultimately as 'Explainers' in Launch Pad, developed from unobtrusive observer to highly visible facilitator and performer.



(*Figure 4.8*) Test Bed assistants with visitors on interactive exhibits c.1984-86 © *Science Museum/Science & Society Picture Library*

The Test Beds were prototype interactive galleries, which as the name suggests, were designed to pilot exhibits with the public before refinement and construction for Launch Pad itself. The two images in (*Figure 4.8*) depict activities undertaken in different Test Beds, highlighting the *facilitative* function of the assistant at this point in time, observing and talking to the child on the interactive exhibit.

The available documentation charting the growth and progress of the Launch Pad project affords much greater clarity in terms of its intentions, audiences, objectives and development than is the case for the Discovery Rooms and the Science Club. As noted, Wilson and Gillies' evaluation study of the Science Circus visit reveals that the possibility of a permanent science centre was already being given serious consideration in its wake. Although Leverhulme Trust funding was confirmed in November 1983, it was not until eight months later, on 18 July 1984 that the full financial supporting arrangements were revealed to the public at a press conference held at ScM to formally announce the Launch Pad project. ScM's own press notice lists the three strands of funding: £350,000 from the Department of Trade and Industry; £350,000 from the Leverhulme Trust for staffing and research; and the remaining £300,000 to come from the Museum itself. In addition, funding from one of the Sainsbury family charities to provide seed capital for five or six similar ventures around the country was announced (Anon: 1984). In the same release Director Dame Margaret Weston declared the Museum's ambition that the new gallery would help to 'launch some young people towards new careers in technology and engineering' (Anon: 1984), a message that it continues to promote to the present day. These sentiments were echoed by Mr John Butcher MP, Parliamentary Under Secretary of State for Industry, also speaking at the event and who used the opportunity to make a thinly veiled attack on the government's education department over the lack of guidance offered to young people when making their subject choices for future careers. He linked the ambitions of Launch Pad with those of his own Department, and principally the aim to 'help ensure that more young people of all abilities develop an interest in technology, science and business careers and take appropriate courses', a foreshadowing of *Bodmer's* aspirations for improved understanding that 'the importance of science extends, naturally, to people's personal lives as well as the economic life of the country' (Royal Society 1986:2).[87]

The process of planning, designing and creating the new gallery had already begun in earnest well before this launch event with teams being assembled and staff allocated to roles. Anthony Wilson, by then Head of Education took on a leading role and it appears it was he who gave the gallery its name:

> The Director has suggested that the title might reflect the function of the Centre, in particular the role it will play (as the Children's Gallery has done for sixty years) in awakening people's interest in science and technology and inspiring some of them towards a lifetime involvement in these field. I have proposed the name 'LAUNCH-PAD' as a possible one, and this is being used as a working title for the time being'.
>
> (Wilson 1983b: 4)

Wilson's 'working title' clearly slipped into permanent usage and on 11 June 1984, the first meeting of the 'Advisory Panel for Launch-Pad Project' took place. The Minutes for this meeting record the early-agreed aims for the project and also highlight the fact that the emphasis for the gallery was to be on exhibits that explored technology and its various applications, a reminder of the fundamental messages in both the *Bodmer* (1985) and the *Science and Society* (2000) reports, and an illustration of how ScM appears to have consistently kept abreast of such recommendations. They also confirm that a team of exhibit developers were preparing a range of exhibits for a 'Test Bed', which was to open on 1 August in Gallery 4, notably the same location as the summer holiday Discovery Rooms of 1981-83, strengthening the developmental continuity of the line from Discovery Room to Test Bed to Launch Pad.[88]

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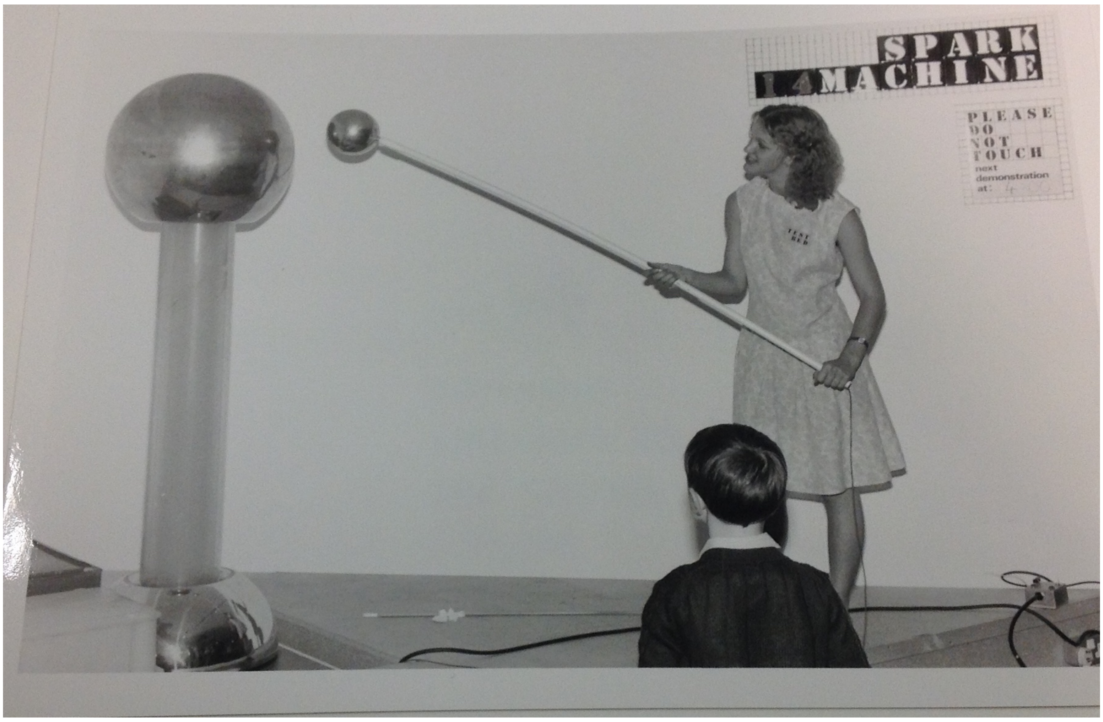
[87] The science magazine *New Scientist* also picked up on the tension between the Department of Trade and Industry and the Department of Education and Science. In a report on the Launch Pad project launch event observing that 'the next few months may show that the Department of Trade and Industry is not too satisfied with the Department of Education and Science's progress in providing Britain with new generations of technocrats'. New Scientist, 26th July 1984.

[88] The Discovery Room for the 1983 Christmas period was housed at the North end of Gallery 5 owing to Gallery 4 being unavailable. A memo (Wilson: 1983c) confirms logistical arrangements for setting up and dismantling the Discovery Room.

The Launch Pad project team ran three separate Test Bed ventures at different points during the two years leading up to the opening of the gallery itself (August 1984-July 1986). As with the Discovery Rooms, they were open to visitors for a defined period of time, and for Test Beds 2 and 3, separate sessions were available for school groups who booked in advance. Although evidence concerning the specific role of the assistants in the Test Beds was not readily available some detail is offered by a *Report on Test Bed 1 – August 1984:*

> The assistants demonstrated the Spark Machine five times each day. Both assistants enjoyed the work and were sorry when Test Bed closed.
>
> (Anon 1984b: 1)

This brief reference reveals that not only did Test Bed 1 include practical demonstrations performed by assistants, but also that there were two assistants at that time. (*Figure 4.9)* shows an assistant performing the Spark Machine demonstration.



(*Figure 4.9*) Assistant demonstrating the Spark Machine in ScM Test Bed 1, 1984. © *Science Museum/Science & Society Picture Library*

It is clear from (*Figure 4.9*) that the assistant is not wearing a uniform and is only identifiable by a badge labelled 'Test Bed', presumably part of the intention that they should remain unobtrusive and blend in with visitors. This lack of uniform also indicates a lack of formalising of the role at this time. MGR1/SCM/15 recalled that by the time of the early Launch Pad assistants the wearing of white lab coats for practical, protective purposes, and also a name badge was common practice (*Figure 4.10*), but it was not until 1989/90 that a specific uniform – a green sweatshirt – was introduced (*Figure 4.11*).

(*Figure 4.10*) Assistant/Explainer performing bubbles demonstration in Launch Pad c. 1988. © *Science Museum/Science & Society Picture Library*

(*Figure 4.11*) ScM Explainer giving small-scale demonstration to visitors c. 1990. © *Science Museum/Science & Society Picture Library*

Later still, in the 1990s, the uniform became further formalised to comprise a green polo shirt and navy ScM-branded cardigan (*Figure 4.12*).

(*Figure 4.12)* ScM Explainer assisting visitor with interactive exhibit c. 1995. © *Science Museum/Science & Society Picture Library*

All the available evidence points to the Test Bed assistants' role as having three core functions: offering help and further explanations to visitors as required; providing demonstrations of a handful of exhibits that were deemed health and safety risks should visitors be allowed to conduct them themselves; providing running maintenance of exhibits. It is apparent that the primary emphasis was on the former of these three functions, certainly in the eyes of visitors themselves. A brief report on Test Bed 2 (December 1984 – January 1985) summarised visitors' responses to the role of 'helpers' thus:

> To talk at the right moment. To step in when the play/thinking balance is wrong. To monitor the state of exhibits. To answer questions.
> (Williams 1985: 2)

This notion of 'stepping in' and only engaging with the visitor 'at the right moment' seems critical to early perceptions of the role and suggests a strong belief, echoed by ScM itself, that the assistants must not intrude on visitors' engagement and self-directed use of exhibits. The aforementioned lack of uniform contributes to this idea in the initial phases. Indeed, archival documents relating to the core educational and experiential philosophies and intentions driving Launch Pad all point to this same desire for 'unobtrusive surveillance (…) and encouragement that the helpers [would] provide' (Wilson undated: 2). One plausible explanation for this approach might be concerned with the relative newness of hands-on, interactive visitor engagement. If visitors were unused to such methods, having previously more commonly experienced more didactic lecture-demonstration-type activities, the Museum may have initially sought to play-down the potential for deeper enhancement of their encounters. This view is supported to some large extent by the observations of John Stevenson in his PhD thesis (1993) exploring the long-term impact of interactive exhibits in Launch Pad:

> The role of the helpers or "Explainers" is to talk to visitors in Launch Pad, answer questions, encourage exploration and discovery, or perhaps just talk about the weather. They were rather discreetly dressed and kept a fairly low profile in order not to make visitors feel threatened in any way.
> (Stevenson 1993: 167)

Employed as Education Officer from November 1979-February 1990, Stevenson played a central role in the planning and development of Launch Pad and as such his comments are assumed to represent the Museum's intended approach. The notion that visitors might possibly 'feel threatened' by the presence of an assistant strongly suggests that not only was this a novel approach that required caution, but ScM had not at this stage realised the full potential of using people-based interpretation. In its early iterations a requirement of the role was to be *unobtrusive* (see 4.5), the antithesis of what is seen in the Explainer role today, highlighting the experimental nature of the approach. Until the role and its methods had been properly tested there was likely a lack of confidence that audiences would accept or appreciate interventions, preferring instead to simply be aware that someone was available to assist should they require further explanation. A former SMG learning manager, who also worked as an Explainer at ScM during the mid-late 1990s and then as a manager in the Education team across several of its sites, described their thoughts about what might also have been intended by the word 'unobtrusive':

> I wonder *back then* when they used that word, did it imply that they were more invigilators, so they weren't to interfere - if the gallery was actually themed on these hands-on things that you can *do*, and you let people do them, and it's about them self-directing and learning for themselves, so you're unobtrusive, you're in the background just observing. Or did they mean it, unobtrusive, sort of how we talk today, about how you all become moulded into one thing together (…) So it's not like you're stopping them for 15 minutes and going to give them a lecture (…) I think it's about not interrupting (…) 'playing' or whatever, doing something, then you stand in the background until they ask you. But then my question about *that* is, will they ever stop and ask you? Because they think you're an expert (*laughs*). (MGR2/SCM/15)

These musings reflect some of the problems associated with attempting to decipher the intended meaning of the word in this context over thirty years later, but their final comment also alludes to the reasons why the role emerged as far more visible and active in its later iterations. Possibly it was discovered that visitors were less than forthcoming about directly seeking help from the assistants and that if their potential was to be realised a radical shift in approaches to them needed to be effected. Aubrey Tulley supports this idea. He describes some of the changes to management structures that occurred in December 1986, less than five months after Launch Pad opened, which saw Michael Williams put solely in charge of the gallery, having previously shared that responsibility with two others, an arrangement which appeared to have been unsatisfactory for all concerned. Williams quickly commissioned an evaluation of the first few months of Launch Pad's operations and as Tulley identifies, the findings resulted in the assistant role being redefined and their training and deployment reviewed:

> One of the problems had been the clustering of assistants, this clearly meant that they were not watching the gallery and more important were not responding to the needs of the visiting public.
>
> (Tulley 1993: 10)

Tulley goes on to describe how the demonstrations given on gallery at regular intervals were one of the 'most satisfying' elements of the assistant's role, both for themselves and for visitors. His account culminates in July 1990 but of course, the programme of events and activities associated with Launch Pad continued and developed, with the addition of theatrical science shows, interactive storytelling sessions and increased provision in demonstrations. It is not unlikely then, that very early on the view of the assistant as providing an 'unobtrusive' presence in Launch Pad was revised and new plans drawn up to find more consciously visible and entertaining ways of engaging visitors. My interview with (MGR2/SCM/15) the former employee who had been a Launch Pad Explainer from the mid-1990s confirmed that science shows were firmly established by that time. Another former senior learning manager (MGR1/SCM/15) recalled that the practice of using performance strategies as a means of engaging audiences evolved quite naturally and that the Explainers 'started doing them by themselves' in the form of practical demonstrations and experiments. MGR1/SCM/15 described how the success of these informal, almost accidental beginnings in Launch Pad led to performance being used as a motivational tool where the 'people who are good at performing' were identified for further investment and training:

> When I started managing we started to think, 'right well let's build an area, let's do some training and some presentation skills and let's get'…because rather than, the theory before had been that everybody could have a go, and I was like well 'let's choose the people who are good at performing shall we?' (*laughs*) and 'let's make it something of a career progression within the team and let's really invest in getting it right', because most people have a fear of public speaking or standing in front of an audience and they've got a lot to gain, so it became the inner drive of the unit, more and more performing, it kept people longer and also it was great for the public, and also it put Explainers on stage where senior managers suddenly had to take notice because they walked past a crowd of 300 people watching this person on stage – that didn't happen before, so it was a conscious, calculated move. (MGR1/SCM/15)

This 'conscious, calculated move' represents the moment when the shift away from unobtrusive towards proactive occurred, and in this sense can be seen as the realisation of the modern Explainer role. In the next chapter I explore this idea in greater detail and examine how the performance of shows and storytelling, particularly at ScM itself, is sequentially structured so that only those Explainers who are considered fully proficient are trained to deliver the big science shows.

I was unable to determine whether any of the Test Bed assistants were subsequently also recruited to work in Launch Pad but it appears that the Launch Pad assistant role was quite radically re-shaped after only a few months in operation. Numerous archival sources documenting the planning stages of the gallery refer to the use of 'trained' assistants or helpers (Anon 1984c; Anon 1986). I could find little evidence of the type of training that was planned, but again, Tulley's chapter provides useful evidence of what must be regarded as an eyewitness account. Writing about the period between Test Bed 3 and the opening of Launch Pad in July 1986, he observes:

> It was during this period that the first gallery assistants were taken on. The idea was that they should receive training in preparation for their work with the visitors when the gallery opened. In practice they spent the majority of their time helping with the development and the testing of prototypes with groups of visitors, a task which they performed with enthusiasm and effect. (…) By contrast, two or three months after the gallery opened much of their enthusiasm had evaporated amid the turmoil of that first summer in Launch Pad where the pressures of capacity crowds day after day left no time for the reflective and creative work which they had enjoyed when they first joined the project.
>
> (Tulley 1993: 9)

In spite of the clear priority that been given to the training of assistants on paper, in reality it seems that this simply did not occur – perhaps giving rise to the 'clustering' behaviours and lack of effect in engaging visitors that instigated the need for swift change. As implied in the aforementioned example of structured, sequential training of Explainers for performance, training began to be taken far more seriously – both as a way of improving the quality of the experience for visitors, but also as a motivation and reward for the Explainers themselves. This approach endures in the present day and the SMG have made attempts in recent years to implement a training programme that can be broadly rolled out across all its sites. As will be explored in the next chapter, how effective this is in practice is largely determined by the size and stability of the teams.

As confirmed by MGR1/SCM/15 by the end of 1992 a structured training programme was in place and the term 'Explainer' had become formally adopted. *Update*, the internal newsletter of the time posts the following item:

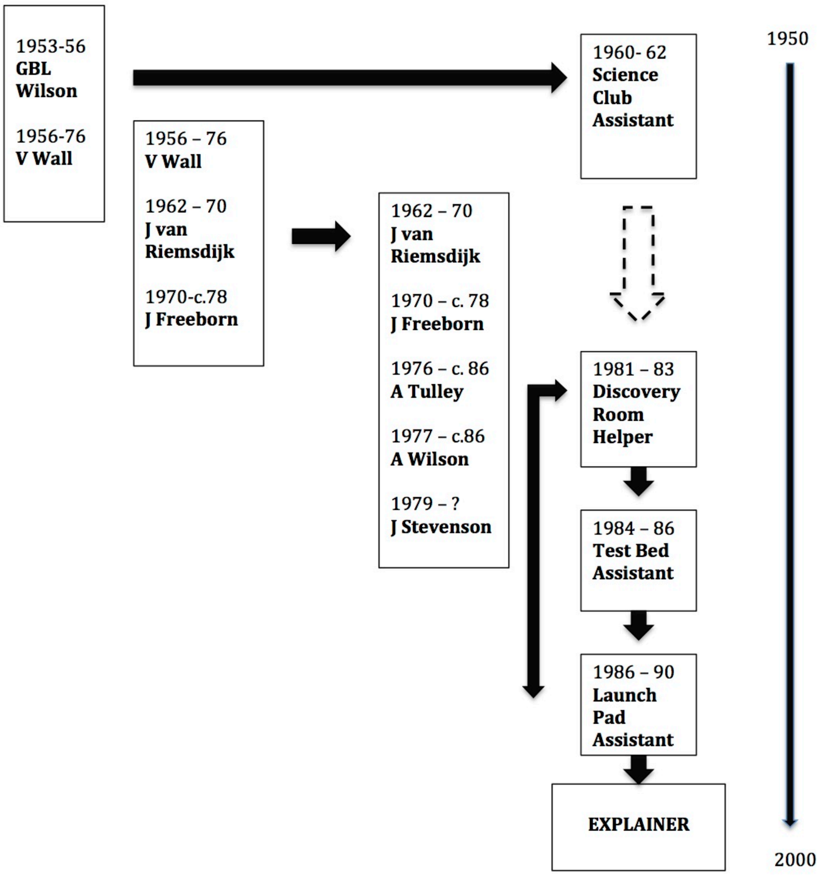
> Once again the Explainer Unit (*Launchpad* and *Flight Lab* to you and me) has been headhunting for new staff and has found another six graduates to join the ever-expanding team, now affectionately known as the 'Grad Pad'.
> (Anon: 1992/3)

Significantly, this confirms that the title Explainer was in use by this date, probably quite newly so since the news item clarifies its meaning, although MGR1/SCM/15 recalls that it began to first be used some time around 1989/90, having gone 'through the usual "facilitator", "enabler" stuff' and decided as a team on 'Explainer'. This example also provides evidence of the type of person sought by ScM. The 'graduate' status of potential recruits marks a clear divergence from the 'high-school' student model preferred by the Exploratorium and points to a valuing of knowledge, skill and broader experience as a foundation for the role. 'Intensive demonstration training' (Anon: 1994) was underway in Autumn 1994 indicating perhaps that this period in Launch Pad's history marked the introduction of the demonstrative science shows that have since become a regular and highly popular feature of the Explainer performed repertoire.

4.7. Conclusion

In this chapter I have extended the lineage of the contemporary SMG Explainer through an exploration of three similar roles from the 1980s-1990s. By outlining the context of change in attitudes to science communication that were apparent during this period I have positioned these three similar roles as intrinsic to the developments towards interactivity that characterised the era. It is apparent from the archival evidence that within ScM, this move was not a wholly conscious one in the first instance, more perhaps, a serendipitous result of the merging of certain events and personalities.

That the San Francisco Exploratorium and the Ontario Science Circus influenced the development of Launch Pad's philosophy, educational aims, structure and even physical design is well recognised and uncontested. What has not previously been concretely articulated however, and I have shown in this chapter, are the ways in which these institutions contributed both directly and indirectly to the development of the Explainer role within ScM. In addition, I have illustrated how that role evolved from the experimental practices of the Discovery Rooms and Test Beds, and how in turn, these were perhaps themselves influenced by some of the practices evident in the Science Club of the 1960-62 period. In this way, I suggest that the line of demonstration/ performance-focussed explaining has continued to thread its way through the development of ScM – at certain times more obviously than at others. In the next chapter I suggest how these forms have culminated in the current period in the highly theatricalised form adopted for some presentations by the contemporary SMG Explainer. The framework of vertical transmission is not as strongly evident in these examples as was shown amongst the Guide Lecturers, not least because, with the exception of GBL Wilson, it has not been possible to identify specific individuals amongst whom it can be said that practices have been directly handed on. However, I suggest that although there is a different mode of transmission than that analysed in the two previous chapters, a pattern of verticality can nevertheless be detected amongst the variously named assistant roles in the Discovery Rooms, Test Beds and Launch Pad, and it is this verticality that facilitated the transference of similar skills across the roles. Quite possibly it also happened as a result of some of the same people being employed as assistants in the Discovery Rooms and the Test Beds, although this could not be proved. This being so, it could be said that a transmission of skills from cohort to cohort, rather than master to disciple was in operation, which would also incorporate a form of horizontal, or peer-to-peer transmission, the type of which can be strongly seen in contemporary practices and further explored in the next chapter. To revisit the diagram used at the beginning of the chapter, this pattern can be represented thus:



(*Figure 4.13*) Diagram showing the vertical and horizontal relationships between iterative Explainer roles and ScM Lecturers

The relationship between the three iterations of assistant and the 1960-62 Science Club assistant is marked in the diagram by a clear dotted arrow in order to represent the separation of time. This role cannot be seen to be causally linked to the Discovery Room Helper role, but as I suggest, the earlier role can be viewed as an attempt at a preliminary model that lay dormant until the conditions within the broader Museum culture and shifting attitudes in science communication were more conducive to its success some twenty or so years later. The probable connection that I have made between GBL Wilson and the Science Club assistant role is marked by an unbroken horizontal arrow, highlighting the tangible link between the practices of the Guide Lecturers and the iterative Explainer models extant in the latter part of the twentieth century.

The enduring vertical transmission amongst the Guide Lecturers can also be clearly seen, as well as the interesting relationship between the final three Lecturers, Tulley, Wilson and Stevenson and the various iterations of the 'assistant' roles from 1981-90. These three individuals, each beginning their ScM careers as lecturer, went on to hold a variety of different education roles as the service developed (including Tulley and Stevenson as Education Officers and Wilson as Head of Education) and as Stevenson reports, together they 'formed a team which provided the educational direction for the [Launch Pad] project. We devised the overall strategy, organised the selection of exhibit ideas, supervised their evaluation, recruited the Launch Pad helpers and established day-to-day working practices' (Stevenson 1993: 21). Additionally, as previously discussed, between them they were fundamentally responsible for the establishment of the Discovery Rooms and for the visit of the Ontario Science Circus. Their influence then, if not strictly vertical in the sense that has already been discussed, permeates all attempts to develop a facilitative role for visitor engagement throughout the 1980s. In Chapters 2 and 3 I made use of Ian Watson's application and understanding of 'direct training' as a way of considering verticality in the relationship between Davy, Faraday and Tyndall, and the Guide Lecturers. Watson also offers the counter notion of 'indirect training' (Watson 2001: 1) as a model of the learning of a craft that can be applied in a variety of ways – a gathering of skills that are then used to shape and inform a performer's subsequent interpretations. Watson suggests this indirect approach enables a performer to 'learn a basic grammar of performance and apply that grammar to creating performances' (Watson 2001: 1). The influence of Tulley, Wilson and Stevenson can be seen to resemble this indirect approach, broadly passing on skills and a culture of practice. In this way a direct link between ScM lecture-demonstration practices, which are themselves tied to nineteenth-century RI traditions as previously illustrated in Chapter 3, and the Explainer role as it emerged in the early 1990s is established, but one that reinterprets the path and temporarily sidesteps notions of the vertical. As is explored in the next chapter, contemporary practices demonstrate a return to a much stronger sense of traditions and skills being directly and consciously passed on to the next generation.

In the next chapter I present a detailed study of the contemporary SMG Explainer role.

Chapter 5
Perspectives on the Contemporary SMG Explainer (2000-2016)

5. Introduction

The preceding chapters have explored numerous roles and practices at ScM that I propose are seen as iterations of the contemporary SMG Explainer role, setting out a lineage that, as I argue, can be related to lecture-demonstration practices at the RI. Using Performance Studies theories of embodied knowledge transfer practices, intertheatricality and vertical transmission I have further suggested that this relationship can be viewed in terms of nineteenth-century RI practices being restored in subsequent ScM practices. These chapters have been historical in content and have focussed specifically on the London-based past practices of ScM and the RI. Additionally, they have explored only in broad terms the political contexts that have shaped developments – for example in Chapter 3, the influence of the 1911-12 *Bell Report* on the subsequent provision for person-led interpretation (see 3.2), and in Chapter 4, the impact of the *Bodmer* (1985) and *Science and Society* (2000) *Reports* on shaping the public understanding of science (see 4.3.1).

The more recent political context of the 2010-15 UK governmental deficit reduction measures has had a profound and specific impact on the funding arrangements for the SMG, resulting in significant changes to Explainer practices, notably at its regional sites (NMeM and MSI). These changes have been largely characterised by institutional shifts towards STEM-related interpretative policies and outputs, and have transformed contemporary approaches of the regional sites. Consequently, the tone and style of this chapter shifts somewhat from the other chapters in order to address the impact of the political landscape in more depth than has previously been considered necessary. Additionally, the focus of location also shifts and is here predominantly centred on the Bradford-based NMeM, where the impact of change has been most radically felt.

As the Explainer role has developed at ScM and been extended to the other museums in the SMG, it has evolved to incorporate increasingly interactive practices, reflecting contemporaneous trends in science communication and interpretation, and as this chapter illustrates, current practices utilise a variety of high-impact performance-centred strategies. Taking up from where the previous chapter left off at the end of the twentieth century, this chapter brings perspectives on the role of the Explainer up to date with an exploration of its function, purpose and operational style in the first part of the twenty-first century.

5.1.1. Chapter rationale

Chapters 3 and 4 have concentrated uniquely on the development of Explainer antecedents at ScM, but the discussion here necessarily extends further to also consider the role as it exists at MSI and NMeM. In order to reflect the collaborative research relationship between myself as researcher and NMeM as the core site, this chapter has a broad emphasis on certain of *its* Explainer practices as well as on the wider impact of changes introduced to its Learning provision during the period of this research and the several years immediately preceding it. The chapter considers the following concerns:

- The consequences of economic constraints imposed as a result of UK governmental deficit reduction measures (austerity) and the impact of managed restructuring activity across the Group, and particularly on NMeM
- SMG Learning philosophies and the focus on STEM-based content as a new development for NMeM
- Perspectives on the SMG Explainer role and an examination of the ways in which contemporary practices reflect earlier models
- The expansion of a 'branded' Explainer and how this can be viewed in terms of vertical transmission
- The status of the SMG Explainer role within the broader museum hierarchy

Additionally, the chapter explores my usage of the new term *performed explaining* to describe the presentational aspects of contemporary Explainer work.

The content of this chapter broadly addresses subsidiary research questions 1, 2 and 3:

1. What does a focused analysis of the role of the Explainer and its antecedents reveal about the historical and cultural development of the SMG?
2. What are the shifting attitudes of the museum industry to the role of the Explainer and its antecedents in the period?
3. How do conceptions of expertise, value and status play out in this sphere?

As articulated above, this chapter demonstrates a clear shift away from the predominantly historical focus of the previous chapters to reflection on current views of an existing role. As a consequence the methodological approach I have taken has also necessarily shifted and where previously I have used a combination of secondary and mediated archival sources, here I have been able to work with primary sources, often documentation in current usage, alongside numerous qualitative research methods. Primary evidence has been gathered through observations of Explainers conducted at all three museums both within the period of research (NMeM and MSI) and at various points during the period 2010-2012 (ScM) whilst I held my previous role as Learning Programmes Coordinator for Schools at NMeM. As a collaborative doctoral researcher it is axiomatic that I was embedded in the Learning operation of the partner institution, but I acknowledge that my previously-held professional role within that team deepened my understanding and close knowledge of its practices. Additionally, and particularly early on in the research process, this previous connection undoubtedly influenced my reactions to the internal organisational politics surrounding the change management programme, although as I became more personally separated from these I was able to adopt a more distanced critical stance.

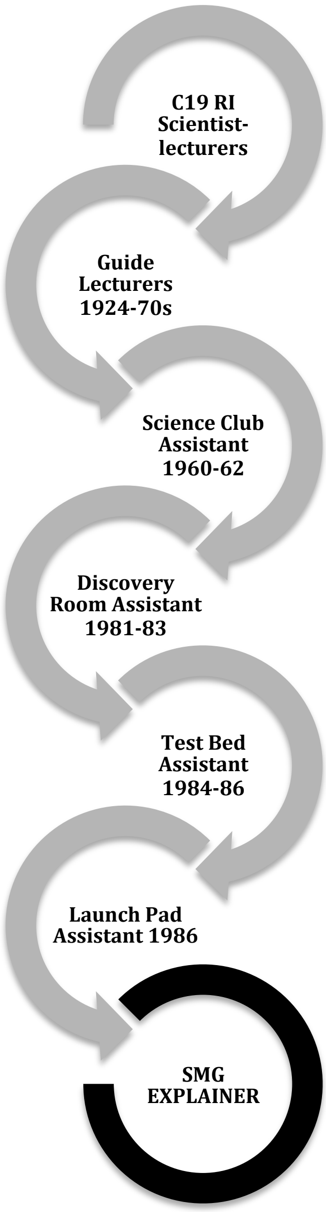
In addition to the observations, semi-structured face-to-face and telephone interviews were conducted with current and former Learning managers, Explainer team leaders and Explainers at MSI and NMeM. This evidence was supplemented by online questionnaire responses from Explainers at NMeM and ScM. Significantly, this data has facilitated a strategic gathering of evidence from across three tiers of the hierarchy in the Learning teams: Explainers, middle managers (Explainer team leaders) and senior managers (heads of department) enabling a cross-section of views to be represented. Consequently the chapter regularly features the testimony of current SMG employees, as well as that of those who have only recently left the Group (i.e. since this research began). However, the predominant voice is of the Explainer and as such attitudes, experiences and viewpoints of current holders of the role are represented. As identified in the methodology section in Chapter 1 (1.2.1), comments are anonymised and where appropriate for the ease of reading, a substitute first name has been used.

The sources used in this chapter are varied and centre on a range of SMG internal unpublished and published planning and policy documents, annual review and promotional materials as well as reports that are in the public domain. They include:

- NMSI Internal Guidance on Life Enhancing Experiences (2009)[89]
- ScM Presentation and Facilitation Skills Training (2011)
- SMG/NMeM Explainer Job Description (2012)
- SMG Annual Reviews (2012-15)
- ScM Strategic Ambitions (2012-22)
- MSI Explainer Job Description (2013)
- Uncorrected transcript of oral evidence (HC507-i) Culture, Media and Sport Committee - The Future of the SMG (2.7.13)
- SMG Development Plan (2013-17)
- NMeM Visitor Exit Questionnaire (April 2014)
- SMG Learning Strategy and Actions (2014)
- NMeM Priorities for 2014-15

In the previous chapters I have illustrated the suggested Explainer lineage in simple diagrammatic form, showing how with each chapter the connecting chain of roles is expanded. This chapter can be seen as contributing the critical final link in the chain to complete the lineage up to the present day:

[89] NMSI is National Museum of Science and Industry, the former name for the Group now known as the SMG.



(*Figure 5.1*) Representation of Explainer role lineage from C19 to present day

I begin the chapter with some refection on the difficulties encountered by the Group, and particularly NMeM, in its most recent history.

5.2. Perspectives on the impact of austerity (2010-2015)

During the period 2010-2015 the SMG has felt the impact of the wider national austerity measures implemented by the Conservative-Liberal Democrat government of the time, measures that have adversely affected many cultural institutions, experiencing progressive reductions in its funding, the first of which was announced in May 2010. A second announcement on 5th December 2012 following the then Chancellor George Osborne's Autumn Statement declared further cuts of 1% and 2% for 2013-14 and 2014-15 respectively (Osborne: 2012). A letter from DCMS to SMG Director Ian Blatchford insisted that frontline services should continue to be prioritised and that the SMG should identify and implement the most cost-effective ways of delivering public services (Foley: 2012). Savings have largely been made through procurement, the rationalisation of storage facilities and a reduction in staff numbers. The SMG's dependence on the reduced DCMS grant-in-aid funding has thus resulted in a period of managed changes and reductions in personnel, as well as a sharpening and redefinition of its public offer.

Most recent responses to this economically precarious context from the SMG executive have been bold and defiant. Its Annual Reviews for 2013-14 and 2014-15 for example, have trumpeted its various successes despite the significant reductions in governmental financial assistance, and consequently, its personnel. Such responses seldom overlook the opportunity to hammer home the importance it places on reviewing appropriate alternative funding streams, declaring that it considers 'fundraising [to be] the oxygen' (Science Museum Group 2015a: 28) of the Group. These pages of its most recent Annual Reviews are crammed with stories justly celebrating the achievements of its various sites across the county, but the London-centric nature of the organisation is unmistakeable.[90] In view of its history stretching back over one hundred years, the fact that ScM is the lead partner, the largest, and titular, of the museums in the Group, and its prime location in a capital city that attracted 'a staggering 17.4m overseas tourists' in 2014 (Blatchford: 2015), it is unsurprising that *it* commands the lion's share of interest and publicity in its own self-affirming end of year review.

It is clear that the SMG outwardly seeks to present a picture of strength and success despite the harsh economy, heralding for example the opening of a major permanent gallery *Information Age* and plans for a new maths gallery at ScM. Director Ian Blatchford is nevertheless cautious and alongside these celebrations of achievement and increased visitor figures he points out that the '"boom" would vanish like the morning dew if there were major funding cuts in 2015' (Blatchford:

[90] For example: page allocation for stories about each individual site in the years 2013-14 is: SCM-17; MSI-5; NRM-4; NMeM-3; combined SMG stories -23 (SMG: 2014). In 2014-15 it is: SCM-18; MSI-5; NRM-7; NMeM-3; combined SMG stories- 30 (SMG: 2015).

2015). In his final Spending Review (November 2015) as Chancellor George Osborne announced that although the DCMS core administration budget would fall by 20%, funding for the Arts Council and national museums and galleries would be increased (Osborne: 2015). Additionally, he confirmed that entry to national museums would remain free. This announcement combined with recent awards of £3m from the Treasury and £1.8m from the Wellcome Trust to MSI towards the creation of a new special exhibitions gallery (Science Museum Group: 2015a), and £1m from Bradford Council to NMeM towards the creation of its new light and sound gallery as well as a £7.5m investment in NMeM from within the Group itself (National Media Museum: 2016a), suggest that, for the time being at least, the funding situation for the SMG appears stable.[91]

Each of the three museums featured in this research has a Learning department that is responsible for the delivery of all educational activities and for the management of Explainers. Each department has its own management structure and head, with varying responsibilities specific to each site, but all departments are strategically led by the SMG Director of Learning, based at ScM. The subsequent sections in this chapter relate specifically to the Learning teams.

5.2.1. A change of culture: NMeM Learning (2010-2015)

As a direct result of broader economic austerity measures, the period 2010-2015 has borne witness to significant changes in personnel structure and numbers at NMeM, alongside a major shift in focus for its collections and exhibition priorities. This shift has seen the Museum redefine its emphasis so that it will now concentrate explicitly on science and technology themes. The Learning programme has embraced a STEM focus, the impact of which, with particular reference to the Explainer role, is explored in the next section.

At a staff meeting in December 2013 Jo Quinton-Tulloch, Director of NMeM, (appointed September 2012), outlined for staff the Museum's new Strategic

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[91] This view cannot take account of the unprecedented developments that began in June 2016, at the very final stage of work on this thesis, following the result of the UK referendum to leave the EU and the subsequent change in leadership of the UK Conservative party that saw David Cameron resign and Teresa May take his place. The scope of this thesis culminates before any further decisions have been made and as such, can only be viewed in the context of the immediate moment.

Ambitions for the next five years. Following an extended period of consultation with staff themselves six new strategic objectives were identified, the third of which being: 'Learning will be part of everything that we do, with a focus on science and technology, drawing inspiration from our collections' (Quinton-Tulloch: 2013) [92]

In view of the significant number of redundancies that have been implemented across all levels and all departments at NMeM - a 30% reduction overall in the period 2010-15, equating to a 30% loss of staff (Terwey: 2016) - this prioritisation of Learning as an integral contributor to its new vision must be regarded as evidence of a strong indication of future security for its staff, and Explainers in particular, since it is largely through them that Learning outputs will be delivered. In pursuit of these objectives, Quinton-Tulloch defined a series of actions and commitments, emphasising the iterative nature of the process and its framing within the overarching need to save costs in the short, medium and long term. Indeed, the impact of the change management process continued to be felt as late as January 2016 when further redundancies equating to a loss of five roles were revealed, largely amongst curatorial staff, as a consequence of the transference of the Royal Photographic Society's collection, housed at NMeM since 2003, to the V&A.[93] The loss of much of this collection is perhaps ameliorated by the (less widely-reported) transferal of world-changing collection items from ScM to NMeM (National Media Museum: 2016a).[94] Quinton-Tulloch has made it clear that NMeM now seeks to tell a more cohesive story that includes film, TV and photography

[92] The remaining five were: Care, development and sharing of our Collections will set new standards; Every visitor will have a consistent cultural experience, and engage with a physical or virtual environment of the highest quality; Changing perceptions and practice through participation, community engagement and partnerships will enrich our work and our visitor offer; Targeted, effective external communications will raise our profile and reputation in all media; Development of our staff will ensure they deliver to their full potential and in turn provide the best experience for our visitors, stakeholders and partners.
[93] The decision to transfer over 400,000 objects from NMeM-held RPS collection to the V&A prompted widespread public criticism (Cheesman 2016; Furness 2016; Halliday & Jordison 2016; Jordison 2016a), fuelling long-standing debates about a north-south divide as well as speculation that it represented a step towards the closure of NMeM by stealth (Halliday & Jordison: 2016). This announcement coincided with the news that NMeM was to permanently end its organisation of the Bradford International Film Festival, further enhancing such debates. In terms of their relevance to this research, such actions can be seen as confirming the ambitions of NMeM towards a more STEM-related agenda.
[94] These include unique objects relating to the work of pioneers such as Sir William Herschel, Sir Charles Wheatstone, Guglielmo Marconi and Sir John Fleming.

within the same narrative, but that in line with the broader SMG executive influence, also exploits the STEM elements within the collection in far more explicit ways than have previously been seen.

With respect to Learning, the achievement of the overarching aim is planned for through: building the schools audience through programmes carefully aligned with the new National Curriculum with an emphasis on science; developing the holiday programmes with an emphasis on the inclusion of STEM-related learning experiences; refreshing community working (Anon 2014: 2). In view of the fresh STEM focus those charged with a brief to deliver the associated activities – Explainers - will need to be skilled in ways that are different from previous holders of that role.

The key outputs of the Explainer team at NMeM can be broadly split between those for pre-booked educational groups and those for families.[95] For educational groups it provides informal sessions for Key Stages 1-4 (ages 6-16) that have evolved to include a greater STEM emphasis over the last eighteen months. For example its Explainer-led workshops have upfront titles such as *Shadow Science*, *Wireless Workshop* and *Science of Sound* that leave little room for doubt in terms of their content. The repertoire of Explainer presentations now comprises two shows, *Light, Cameras, Action!* and *Reel to Real*, alongside the only two talks that remain from the previous era of a more media-focussed offer, *The Mystery of the Cottingley Fairies* and the *TV Production Tour* (National Media Museum: 2016b). This programme constitutes a marked shift from the available content at the beginning of this research period when sessions and workshops included titles such as: *Photography in Victorian Times*, *Animation in Motion*, *CinemaMagic*, *Digital Storytelling*, *TV Advertising and Editing* and *Movie Trailer* (National Media Museum: 2012). The unmistakeable observation here is the obvious rejection of almost all the previous media-rich education programme in favour of a new STEM-themed diet of practical workshops and presentations. This preference will intensify with

[95] NMeM Explainers also work with adult audience groups, but educational and family groups represent the two largest and those that are of particular interest to this research.

the planned interactive gallery, titled *Wonderlab*, highlighting sound and light, due to open in 2017.[96]

Informal activities and themed programmes for families are provided during school holidays and weekends and are sometimes repurposed versions of the school programme. In recent years these have successfully included large-scale events in association with commercial ventures such as *Moshi Monsters*, *Scooby Doo*, *Horrid Henry, Dr Who* and most recently *Horrible Science* (February 2016) making significant contribution to the generation of increased visitor numbers. These family-orientated events are predominantly delivered by Explainers although freelancer artists and companies are also regularly invited to contribute.

The shape of the Learning team at NMeM has altered significantly since the change management programme began in 2011, shrinking from fifteen members of staff then, to eleven in January 2016, although the number of permanent Explainers has remained constant at six.[97] Importantly, this reduction in staff has resulted in associated concerns and frustrations voiced by Explainers regarding a lack of time and personnel resource when developing activities:

> Friday is the deadline. I only started working on the rough draft yesterday, I've got to try and finish the whole rough draft today, I've got Fiona on it as well and so she's going a bit mad with it, and so the, it's kind of like crisis management a lot of the time, the deadlines here are too short, and we've talked about this time and time again but they get shorter, and so that's a

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[96] The title of the gallery reflects an increasing homogenisation of the educational programme across the museums in the SMG (see 5.5). Due to open in October 2016, ScM's brand new gallery replacing Launch Pad is also named *Wonderlab: The Statoil Gallery*, the second part of its title reflecting the multi-national energy company Statoil's sponsorship, and the corporatisation of education. A press release quoting ScM Director Ian Blatchford, reveals the overarching ambition for this gallery to 'build on children's natural curiosity in *STEM* to ensure long lasting engagement' and to ensure that it supports its 'mission to inspire the next generation of scientists and engineers to improve the world in which we live' (Statoil: 2016).

[97] This period incorporates episodes of significant challenge when personnel arrangements were further disrupted for example in March 2014, due in part to the move by the NRM to devolve its Learning and Public Programmes operations from the SMG and merge these two teams. As a result, three posts that had been put in place to work across both sites during 2013 were affected: the Learning Operations Manager, appointed in October 2013, was permanently relocated to NRM in February 2014 and the Head of Learning North and the Schools Coordinator both accepted voluntary redundancy.

> frustration because you want the content to be the best it can possibly be. (EXP5/NMeM/14)
>
> From what I've heard, Explainers at NMeM do much more development work than Explainers at any of the other sites. In comparison to Explainers at MSI and ScM I think that Explainers at NMeM have much less time to develop activities, learn scripts and deliver activities. Sometimes we have two weeks to learn an activity, but occasionally we have a couple of days to learn something before delivering it to the public. (EXP2/NMeM/15)

Further semi-structured interviews conducted with Explainers in February 2013 and February 2014 exposed a consistent pattern of frustration regarding the lack of time they considered they had to devote to preparation and learning for new outputs and activities, as well as what they perceived as constantly shifting priorities and, they felt, a lack of clarity from managers. Their observations included:

> Often things are really rushed, and we just, we don't have enough time to complete things or to er, to plan things properly, often you might be given a job to do a couple of days in advance, and then told that the deadline for that is like two or three days and then you have to really rush (…) I just think that people are very run off their feet and often we've got meetings, or we've got things to do and so, it's trying to squeeze things in, sometimes the weekly Explainer meetings don't happen because there is something else at the same time, or Claire needs to be in a meeting with somebody, or we've got to prepare for something and so that communication just kind of falls away. (EXP4/NMeM/14)
>
> Time is the main thing. Claire doesn't have the support, they got rid of Jane, which was a really ignorant thing to do, because Jane was really good. Ruth who's come in is really good, but she's now going, so we've not been on a firm footing for… a year, and that obviously it does have an impact erm on development (…) if we are to develop things and put things out there into the public, there has to be a block of time to do it, and I think when I started here that was the case, and it's not the case, it's not the case any more anyway. (EXP5/NMeM/14)

Such comments reveal how unsettlement caused by an extended period of restructuring has clearly impacted on the workload and levels of satisfaction amongst certain NMeM Explainers. A new Head of Learning and Participation took up the post in June 2014 leaving after just over twelve months in a move that typifies the constantly shifting ground upon which the Museum operates as it continues to negotiate its new emphasis. Nevertheless, in spite of the difficulties of making solid future plans in enduring unsettled times, and in the current context of greater financial stability described above (5.2), the situation in January 2016 appears to promise a more secure foundation.

5.2.2. STEM: a new prioritisation at NMeM

Attitudes of frustration as expressed by NMeM Explainers should be viewed in the context of a five-year period of uncertainty that has seen considerable change in terms of staffing, practice and programme content for the Explainer team and wider Learning provision. Although the impact of funding reduction and consequent shift in strategy and approach has been broadly felt across the Group, NMeM has been affected in particular ways that the other museums have not. The redefinition of its core focus to incorporate STEM themes has been an additional challenge on top of the redundancies and restructuring that have also been felt elsewhere.

Emerging from a brief review of the rationale for this shift towards a science and technology focus is the comprehension that it is intrinsically tied to the SMG's strategic response to the progressive reductions in DCMS grant-in-aid funding, documented above (5.2). In June 2013 NMeM was subject to media speculation that *it* was the site selected by SMG senior executives for closure should the then proposed cut of a further 10% take effect. Although this cut was not implemented, Blatchford stated at the time that three world-class museums would be preferable to four mediocre ones, confirming that NMeM was indeed the site identified for closure had the cut been implemented (Hansard: 2013). A key issue for NMeM was identified as the significant drop in visitor numbers in recent years and addressing this as a priority would involve the inclusion of science and technology as core elements of the programme. Blatchford's remarks during a Select Committee hearing attest to this:

> It is now crystal clear that the priority for the science agenda is paramount in our minds (...) We did take action early by changing the management structures there, so we had people with a stronger science focus. What has also been very striking in our conversations with the local authority is that our concern about getting back to a stronger technology and science agenda

> in the museum is very much on the same page as them (…) the issue with the National Media Museum was that there wasn't enough science; that simple.
>
> (Hansard 2013: Q22 & 30)

This is then, an important moment in NMeM's history and it is clear that its future direction towards a STEM-focussed programme, tentative at the start of this research period, is now firmly decided and launched. In March 2016 NMeM confirmed that its current name, the result of a rebranding exercise in 2006 following the decision to drop its original (1983) title of the National Museum of Film, Photography and Television, will be changed in 2017 to reflect 'its new focus' (National Media Museum: 2016a), presumably making prominent its science museum aspirations. Speculation has included 'Science Museum North' (Halliday and Pidd: 2016) as one potential title. SMG Chairman, Dame Mary Archer confirmed the SMG's aim to 'shift [NMeM's] emphasis towards inspiring the next generation of scientists and engineers, while still celebrating the city's key role in film, photography and television' (National Media Museum: 2016a), the first part of this aim chiming strongly with a catchphrase used to describe numerous projects from ScM itself. The second part illustrates how the SMG is keen to foreground its ongoing cultural commitment and it would be misleading to suggest that the the Group is disinterested in the arts - its wealth of temporary artistic exhibitions and development of new public spaces for this purpose sign its intentions. It is evidently keen to present itself as an organisation that is fully engaged with a range of contemporary forms of performance and to herald their presence in all of its museums, proudly declaring that at ScM itself, 'there's seldom a week without music and drama' (Science Museum Group 2014: 32).

For NMeM however, particularly in view of its past traditions and arts-rich collections, there is a delicate balance to be struck that may profitably openly and fully engage with a STEAM (Science Technology Engineering *Arts* Maths), as opposed to STEM agenda. A senior Learning manager at MSI also stressed the value of creativity:

> I think everything that we do is creative, it's expressive, so I think it's very much part of our identity and I don't think you have to specifically say to a visitor 'we are a science technology engineering arts and mathematics

> delivery organisation' (...) it's just inherent in what we do, and I think it's the same with the 'A'. They see the exhibitions, they see the creative way the place is displayed, they see the funky interactions with different elements of things that we do and I think they would say that we *are* creative and artistic. (MGR1/MSI/14)

If this is also to be the way forward for NMeM it must surely be perceived as a positive step for Explainers, since they will bear the responsibility for the delivery of live 'funky interactions'.

The imposition of a STEM-focussed programme as the driving force behind NMeM's visitor engagement and exhibition policy has impacted significantly on the Learning team, representing a difficult transition for some members of its staff:

> Explainers have had to deal with a change in focus and a move to STEM. This has been difficult but has been received very professionally by all of the Explainers. (MGR2/NMeM/14)

> When we develop material everything has to have a STEM aspect to it, so it's kind of a matter of, I think we're all trying to get to grips with the science curriculum, trying to really develop our understanding of that more. Erm, I think it's interesting that, I think all of the Explainers here have come from kind of arts backgrounds [*laughs*] (...) kind of literature, art, art history, fine art and so we are all trying to get to grips with STEM, and what STEM is, and how it you know, some of us never kind of studied science since GCSE level [*laughs*] (...) I think it's a, it's a steep learning curve really (...) I think I didn't really have much of an idea that it was going to be *so* STEM focused when I got the job. (EXP4/NMeM/14)

> We've not done that much STEM stuff as of yet, I know that there's a lot in the pipeline and I know that's the direction that we are going down and that when, for instance I had to tinker with a talk called *The Invention of TV* (...) it had to be 'STEMified', you know, we had to get the old STEM right in there, even more so than it was (...) it's always thereabouts, but I don't think that there's much of a long term strategy, or that *I'm* aware of, as to how they're going to incorporate it into actual content (...) Some of it is there, for sure, erm, I dunno, it's just the job innit, you're sort of like a plumber, you're told, 'this needs to go in there', so you just go off and do it, don't you, but erm... but, you know, it's a *media* museum fundamentally. (EXP5/NMeM/14)

The perception here of MGR2/NMeM/15 that Explainers accepted and approached the task of embracing a more science-focussed approach with professionalism is borne out by the above comments of the two Explainers, particularly EXP4/NMeM/14. Nevertheless, their efforts during interviews to articulate the actual impact of this shift in practice are revealing: grappling with attempts to recall distant memories of their own experiences of secondary school science lessons; working with content that does not easily demonstrate their qualifications and expertise; feeling that the overriding strategy was not being coherently approached, sometimes resulting in activity that felt artificial or forced; and significantly, a sense that the shift detracted from NMeM's collections or was not quite how they had perceived the job they applied for. As previously noted, both these observations from Explainers were made at a time when the Learning team at NMeM was in a highly unsettled phase, but they provide important testimony of the difficulties encountered by individuals who have been directly affected by the processes of imposed change.

The choice to locate a new 'free science Launch Pad' (Hansard: 2015) in the form of an interactive gallery exploring light and sound, in the site of one of NMeM's most popular, if rather tired galleries, *Experience TV*, highlights the impact of the shift to STEM and suggests a further expansion of the museum towards tourist attraction. But linking the name of ScM's iconic past interactive science gallery with the venture planned for the NMeM, and also with its replacement *Wonderlab* (see footnote 97), more positively suggests, if the experience of Explainers at ScM is any indication, it will likely present encouraging challenges and opportunities for the Explainer role in Bradford.[98]

5.3. SMG Learning philosophies

As the SMG education provision has expanded so too has the apparent need to theorise and conceptualise the programme. This may be partly associated with the justification and validation of its offer in order to ensure that it captures a market share of the big, competitive business afforded by tourism and pre-booked

[98] Then Minister for Culture and the Digital Economy, Edward Vaizey, confirmed the 'thriving' status of NMeM, a commitment to keeping it in Bradford with free entry, as well as describing the new interactive gallery in this way on 22.10.15 (Hansard: 2015).

educational trips. The SMG has a centralised, ScM-based Director of Learning with responsibility for determining the strategic direction of the Learning programme across all sites – a far cry from the days of the self-managed ScM Guide Lecturers and their weekly programmes of tours and lecture-demonstrations, although the motivating factor of visitor self-improvement remains an important element. This in itself is demonstrative of the museum industry's late twentieth century embracing of visitor-centred learning programmes and recognition of the value they can have in contributing to an all round 'experience' (see 1.4.2).

In March 2015 the SMG welcomed a new Director of Learning who has quickly embraced the concept of 'science capital' (Archer, Dawson, DeWitt, Seakins & Wong: 2015) and its interrogation within the *Enterprising Science* project.[99] In arguing for a rethinking of Bourdieusian arts-based forms of capital, Archer et al propose their first iteration of a theoretical model of science capital that combines the following:

- scientific forms of *cultural capital* (scientific literacy; science dispositions, symbolic forms of knowledge about the transferability of science qualifications)
- science-related *behaviours and practices* (e.g., science media consumption; visiting informal science learning environments, e.g. science museums)
- science-related forms of *social capital* (e.g., parental scientific knowledge; talking to others about science) (Archer et al 2015: 929)

As part of the *Enterprising Science* project the SMG Learning have used this model to construct a framework that conceptualises science capital as a 'holdall' containing all of an individual's 'science-related knowledge, interest, attitudes, contacts and resources' (Science Museum Group 2015b: 9) and it is on this foundation that Group currently seeks to build its learning practice. Their approach, which has the objective of building the science capital of the audience, as well as presumably building actual audience capacity, does not seek to 'fill an empty holdall' but instead aims to help them recognise, value and apply science in

[99] Since 2013 SMG has been a partner in the *Enterprising Science* project with King's College London and BP. The project seeks to understand how science capital can inform and develop learning practice and deepen audience impact.

the areas they already know about' (Science Museum Group 2015b: 16) but is clear that it does not see its function as *teaching* about science related content. Rather it seeks to place science capital within more cultural frameworks. Early reflection on what impact a new science capital-led approach might have on its live events has raised two areas for consideration, the first of which has a particular bearing on the Explainer role: 'How can I make an emotional and relevant connection with an audience of 100+ people with different backgrounds?' (Science Museum Group 2015b: 27). [100] It is evident that the SMG continues to value opportunities for expressive means of engaging with its audiences and it is here that the Explainer role will be of most use. It is also clear from the increased STEM orientation at NMeM and a homogenisation of the Explainer role, (see 5.5), that SMG Learning intends to pursue a far greater sense of a shared vision amongst its sites than has previously been the case.[101]

5.3.1. Life-enhancing experiences (LEE)

The other overarching Learning-led strategy that has been influential in the SMG museums during the last seven years or so is the motivation to provide audiences with Life-enhancing Experiences (LEE), recognising 'learning experiences [as being] at the heart of [its] cultural offer' (NMSI 2010: 1). In February 2009 the SMG (then known as NMSI) defined such an experience as producing a:

> 'light bulb' moment, a sense of awe and wonder, a learning experience that is out of the ordinary and that they refer back to, an insight that helps them make sense of their world and enhances their lives.
>
> (NMSI 2009: 2)

One of the ways in which the SMG has attempted to achieve its aims of enhancing an understanding of science and increasing its audiences, is through what it understands as exceptional experiences and encounters provided and facilitated by the Learning teams. This concept of extraordinary learning experiences is here intended to connect with notions of the inspiring and the memorable, and the language used evokes a similarly active response required of the participant, as

[100] The second area identified is: Events have a higher impact if the child is personally involved or there is a memento for example, a photo which helps the experience endure.
[101] The NRM is the exception since it devolved its learning operation from SMG in Spring 2014 due to its strategic aim to privilege social history themes over STEM.

evidenced in the shared mission statement above – here, the visitor works to remember the experience as something wondrous and awe-inspiring, and uses it to aid meaning-making in their own lives. Two former learning managers at different SMG museums (MGR1/SCM/15 and MGR1/NMeM/15) both recalled how LEE was given prominence from approximately 2006/7 when the then newly appointed Director of Learning introduced it as a means of attempting to refresh existing programmes. MGR1/SCM/15 observed how in their opinion, certainly at ScM itself, they were already fulfilling the LEE agenda without it being named as such and thus, the foregrounding of it was simply a re-branding exercise that enabled a new senior manager to put their own stamp on processes.

The LEE strategic emphasis is purportedly used by the SMG in a range of contexts that describe and justify its Learning outputs, as well as in other aspects of visitor experience and engagement, although as some of the comments below reveal, in practice it is not always given the prominence that managers might claim. Additionally, important questions are raised: How can one measure a 'light bulb' moment and understand the impact of it on the lives of audiences at some later point in time? How too can those who are tasked with creating and delivering such experiences be appropriately trained and monitored so that they can be confident in their abilities to do so effectively? MGR1/NMeM/15, reflecting on the difficulties of having to provide the experience, particularly with reference to the development of a new show *Cinemamagic* at NMeM in 2010-11 observed that:

> Explainers had to achieve the Disney Pixar effect, creating shows that worked for children and adults at the same time. No easy task (…) It may be that the whole museum experience was meant to be life enhancing with the Explainer show added value for edutainment – but for me there was always that rub between art and science that refused to weld together. It sometimes felt like trying to put a square peg into a round hole! (MGR1/NMeM/15)

These comments reveal some discomfort with, or at least a questioning of the appropriateness of using theatrical devices and frameworks to present learning about science and this is also reflected in the views of some Explainers themselves:

> In my opinion there was too much focus on shows [2003], and Explainers who were great show presenters, to the detriment of actually explaining science to visitors in family groups or individually. Many of the show presenters were great at delivering a script, but less able to actually explain scientific concepts in a way appropriate for the individual visitor. (EXP3/SCM/15)

The findings of the *Performance, Learning and Heritage Project* (Jackson and Kidd 2008: 119) also identify this potential risk of being unable to reflect on specific learning as a proper outcome of a particular performance. However, this risk was considered minor when compared with the overwhelmingly positive findings of the benefits of performance in a heritage context, a view largely supported by the perspectives of others I interviewed who considered theatrical forms to be a highly effective method of teaching about science in a fun and engaging way. For example another ScM Explainer observed, 'I think [the shows] make science entertaining and accessible to everyone! You can go into a show for fun and come out having learnt – even if you weren't trying to!' (EXP2/SCM/15). This view was similarly expressed at MSI where one of the Explainer team leaders reflected on a performance of *Inventors Wanted* that we had just watched together. It was evident from the reactions of the child audience that they were engaged and eager to contribute during the show – lots of hands were raised each time a question was asked, plenty of children volunteered to come up to the front, they willingly participated in activities such as miming the turning of a cog. The team leader reflected on the learning that might be occurring during this piece:

> We're hitting all the learning outcomes that we could possibly hope to, they're learning the language, they're learning about cogs, pulleys and levers, but they don't know they are because they're enjoying it so much, and that's what we're aiming for is for every experience to feel like that. (EXPTL1/MSI/14)

I witnessed the reactions of children immediately after this performance. A large number of them (12) lingered behind to talk to the two Explainers who had delivered the show. The behaviour of the children towards the Explainers indicated their admiration for them – they wanted to joke with them, be noticed by them, to be physically near them. The impression I had as an observer was akin to watching fans meeting a celebrity, the children excited at being able to meet and talk to the people they had just seen performing in front of them. They wanted to have fake moustaches drawn on their faces in imitation of one of the Explainers who had delivered the show. In the eyes of this particular group of children it was clear that the Explainers were held in high regard. Discussing my observations with one of the Explainers afterwards, they said:

> When you see the kids queuing up like that to have their moustaches, to get their pictures taken, no one could ever question that that's a life enhancing experience (…) What's nice is that at the end of it, they are in awe of the Explainers, they think the Explainers are like pop stars at the end of it, which is amazing! That's not (…) what you're aiming for but it shows that that irreverence means that they see a connection, they don't go 'Oh that's Mr Smith who's just taught us some stuff'.' They think we're cool and they want to do what we do, which is brilliant because that's what's going to make them want to do science and engineering - because they want be like those guys who are having fun with cogs. (EXTL1/MSI/14)

It is significant that the connection EXTL1/MSI/14 makes between awe and performed explaining is an eventual inspiration towards *science and engineering* – not *performance*, despite the inference that the performance element bears some intangible benefit - 'like pop stars'. The children described here as being 'in awe of the Explainers' are surely responding to the excitement and spectacle of the performance they have just witnessed, the *presence* of the performers. In *Stage Presence* (2008) Jane Goodall asserts that notions of performer can be conceptualised through two models: one associated with training and technique, the other with more mysterious connotations of energy and magnetism, an aura of some indefinable quality that is felt or sensed by the spectator (2008:8). Others have also observed the elusive, intangible quality associated with presence (Cohen 2013; Shepherd and Wallis 2004; Harrop 1993; Barba 1991). In Chapter 2 (2.4.2) I explored how the performances of Humphry Davy and Michael Faraday during their RI lecture-demonstrations could be understood in terms of theatrical presence, linking this to the transformative effect it can have on the spectator. Through examples of their practice I showed how a 'commanding, captivating' (Cohen 2013: 219) performance contributes significantly to the altering of a spectator's perceptions. The immediacy of the live moment of performance and the interplay between performer/lecturer/Explainer and spectator that it affords, facilitates the possibility of reaction and response and enables the performer to adapt their performance to the specific conditions of each delivery. In so doing, there can be seen a deliberate attempt on the part of the performer to create a particular effect that enhances the experience for the spectator, contributing ultimately to their sense of awe and engagement. In terms of LEE, these feelings are intended to remain with them, to be re-visited after the performance event and to prompt subsequent sense making or enquiry in the spectator. Viewed in this context, the presence of the Explainer can be connected to the generation of the transformative '"light-bulb" moment' in the spectator and thus is intrinsic to the successful implementation of a core SMG strategic aim. Additionally, it can be said that a similar effect was created by the likes of Davy and Faraday, for which, as I argued earlier (2.4.2) they consciously prepared. Shepherd and Wallis articulate how contemporary performance rejects any sense of the illusion of indefinable quality, arguing that instead it 'knows and shows that "presence" is an effect' (2004: 234), and that 'old-style theatre [that] talks about a star having presence, as a sort of natural quality' (2004: 234) can only be said to have occupied a brief space in theatrical histories. Goodall also points out that since the days of Thomas Betterton (1635-1710) 'players and directors have devised training systems to assist in unlocking the secrets of what makes a powerful performance' (Goodall 2008: 9). Appreciation of this perspective then, reveals how presence can be cultivated, it is a product that occurs when the elements of performer voice, gesture, energy, performance space, time and audience uniquely combine to create a particular, and planned for feeling or response in the spectator. That Davy and Faraday aspired to this illustrates how they also understood this. The selection of Explainers for their communication and performance skills, the cultivating and training of those skills in preparation for delivering a show, the understanding of the ways in which to deliver text for effect all combine to create presence, or a product. It is this product, rather than the element of 'having fun with cogs', that most strongly inspires the feeling of 'awe' amongst the children and that ultimately, shapes the creation of LEE.

In terms of its Key Performance Indicators, in the previously cited document the target for measuring LEE is somewhat imprecisely defined as 'Improved quality of experience for target groups' (NMSI 2009: 3). It is impossible to assess improvement in an activity that is happening for the first time and this is one of the reasons why LEE is difficult to measure. But if 'improvement' in this context is taken to reflect something akin to enhancement, or as MGR1/NMeM/15 described above, 'value added', then it is evident in the reactions of the children to the *Inventors Wanted* performance that they were entertained and engaged.[102]

Nevertheless, the SMG is evidently committed to the imperative to attempt measurable facilitation of some form of transformation within its audiences, and significantly, as the research findings outlined in the LEE paper state, 'Explainers can be key to tipping the experience from fun into learning' (NMSI 2009: 4), since it is through direct Explainer interaction that audiences will be engaged and drawn in into further and deeper enquiry. Importantly however, there is disparity amongst the attitudes and awareness of the NMeM Explainer team in terms of their appreciation of LEE:

> I am familiar with [LEE] from my Museum Studies MA, but it has never been mentioned to me in this job. It is not planned for. (EXP2/NMeM/15)

> Four years ago at the beginning of my time here [LEE] was discussed and referred to. I haven't heard it mentioned in two years. The key focus is STEM. We need to be ramming home the facts of scientific principle. It's about where the money is now. I would stress that the quality hasn't changed - its still imaginative, interesting and engaging, but it no longer forms a part of the discussion process. The focus on quality comes entirely from the Explainers' drive for "putting on a great show". (EXP3/NMeM/15)

> Nobody has ever mentioned [LEE] whilst I have been working as an Explainer. (EXP6/NMeM/15)

> It's what you've actually said to them on the day I think that's the important part of explaining, you're actually explaining things, you're telling them what's going on (…) I think that's the most important part of it…making sure they have their LEE (*laughs*) (…) [LEE] is something that we're constantly taught that they have to go away with and every time we do like a half term, or an activity which we wouldn't normally do we are told 'what's the life enhancing experience in this?', this is what they need to have,

[102] The strategies for measuring LEE are beyond the scope of this thesis. Different research methods with different research questions would be needed to determine whether or not those same children were able to 'refer back' to the moment in a positive way at a point in the future.

> and we're told before like holidays and things, you need to make sure that people go away with that. (EXP12/NMeM/14)

Considering the timings of these statements it is possible that moving forward, the LEE agenda will become much less of a priority, if it hasn't already done so. No new internal publications concerning the subject have been issued since the one-year on appraisal document in June 2010. The comments of the newest recruits to the NMeM Explainer team (EXP2/NMeM/15 and EXP6/NMeM/15) indicate that it has not featured at all in their experience of the role and that the focus on STEM has superseded it. EXP12/NMeM/14's concept of LEE is akin to something that can be packaged up for people to take away with them, but there is little apparent understanding here of how it might look or feel for the individual. In view of the recognised capacity to cultivate presence through training and preparation, a greater focus on the training of Explainers at this site might well serve an improved understanding of LEE and how their own performance can contribute to it. I explore approaches to training in (5.5).

5.4 Perspectives on the contemporary SMG Explainer role

As discussed in Chapters 3 and 4, ScM has been deliberately using people in a variety of ways to help visitors understand and interpret its collections since the Guide Lecturer role was introduced in 1924. In the early 1980s this role developed a more facilitative element and emerged in a series of helper or assistant iterations before beginning to take the shape of the Explainer role as it exists today, exploiting strategies of engagement that have become increasingly performance-based (e.g. science shows, interactive storytelling). As previously articulated (1.3.1) the SMG uses Explainers in all its museums working predominantly with families and educational groups, and in ways that are increasingly similar (see 5.5). At NMeM in 2010 there was an increase in ScM-influence in terms of how Explainers were trained. Indeed, one element of my own role as NMeM Learning Programmes Coordinator for Schools and Colleges at that time was to observe Explainer training practices at ScM and develop and implement a similar programme for Explainers at NMeM. Additionally, ScM trainers visited NMeM in order to deliver their own brand of Explainer advanced presentation training, with a similar approach taken at MSI when it joined the Group in 2012. At NMeM the

Explainer team is significantly smaller than elsewhere with just six full-time staff who are supported by a number of casual Explainers during peak holiday periods. One full time Explainer team leader and one programmes developer also work with the team, although both these roles also have a wider brief to focus on community events and adult-only 'Lates'. At MSI a team of twelve full-time Explainers are supported by two team leaders, five Explainer developers, all of whom have previously worked as Explainers and continue to deliver shows and activities, and also one content developer. The team at ScM is the largest with around sixty full and part-time Explainers who are well supported by numerous team leaders and Explainer developers.

The current job description used at NMeM states the purpose of the role thus:

> Explainers educate, entertain and inspire visitors, interpreting and communicating information about the Museum's subject matter and Collections in unique, engaging ways.
>
> (NMSI: 2012)

It is possibly deliberately indefinite in its description and thus allows for layers of interpretation in terms of the precise nature of what an Explainer might be asked to undertake, particularly since this description is broadly used across the sites. Certainly evident here are expectations of presentation or performance – use of the words 'entertain', 'communicating' and 'engaging' all pointing to this.

Explainer presentations are characterised by three predominant forms: storytelling, pop-up demonstration and science show. One current example of storytelling is *The Not so Sleepy Hedgehog* (see *Figure 5.2*). Typically, a storytelling session runs for approximately twenty-five minutes and follows a similar format that makes use of straightforward theatrical devices such as:

- Symbolic items of costume to denote character – worn over the Explainer uniform of a red or blue t-shirt so that it is always clear when they are playing a role
- Functional props to assist with the narrative and explanation of scientific facts
- Simple backdrops or screens used to designate space or location

- Repetition of words and phrases that the audience are encouraged to speak along with Explainers

(*Figure 5.2*) Explainers rehearsing the storytelling session *The Not so Sleepy Hedgehog*. The simple backdrop, costumes and props are clearly visible.

All three sites in this research offer storytelling sessions that are usually performed by two Explainers with an atmosphere that is relaxed and playful.

Both ScM and MSI offer pop-up demonstrations that occur impromptu in the galleries. These typically incorporate either a big, bold, 'Roll up, Roll up' approach that uses the tradition of a 'barker' to draw people in, assembling a crowd before beginning the act proper; or a more subtle approach where the Explainer engages just one passer-by in some kind of interaction and gradually allows a crowd to form, keen to discover what is going on. These are performed by one Explainer in the non-theatre spaces of the museum galleries. The standard method for such a performance is as follows:

- Explainer sets up a trolley within the gallery, thereby creating a temporary performance space
- Explainer may gather people together by calling out loudly what they are about to do, drawing attention to themselves in order to establish an audience before commencing or, on occasion, adopt a quieter approach of showing just one or two people something that attracts the interest of curious others
- With an audience established, the Explainer performs a short demonstration using minimal props and often involving an audience member as a volunteer assistant

- At the end of the performance the Explainer leaves the gallery taking the trolley with them
- Spectators are free to come and go during the performance and are encouraged by the Explainer to ask and answer questions

The final core presentational mode of the Explainer is the science show, an intrinsic element at ScM itself since c. 2000 (e.g. *Flash, Bang, Wallop*) and increasingly presented at NMeM (e.g. *Light! Cameras! Action!*) and MSI (e.g. *Revolution Manchester*). These shows are presented by one Explainer and utilise a demonstration table and a variety of quotidian items that aid their explanations of scientific fact. Typically a science show lasts for approximately twenty-five minutes and is:

- Performed end-on with audience seated in rows; a simple lighting system is used to create atmosphere with dimmed lights used during certain demonstrations, alongside loud music and slide projections that are frequently changed by the Explainer during the show
- Incorporates up to 10 'experiments' demonstrating a variety of scientific principles in fun ways. For example, the transference of energy during an explosion is demonstrated by firing a Barbie doll out of a small cannon
- Explainer invites volunteers throughout the performance to assist with the demonstrations
- Audience participants are encouraged to repeat key phrases and concepts
- Explainer wears safety equipment as necessary (goggles, gloves)

Of all the Explainer performances the science shows most closely resemble the lecture-demonstration mode of the nineteenth century and are further explored in 5.4.1.

Looking back to its early history reveals that NMeM has a rich tradition of using performance as an interpretive tool. Chris Ford's PhD thesis (1998) documents the rise of the UK Theatre-in-Museum Movement in the 1990s and presents *Action Replay*, the resident theatre company of the then National Museum of Photography, Film and Television, as one case study example. Ford's research revealed a perception amongst those recruiting theatre-in-museum performers that those with a training that balanced theory with practice and therefore had skills necessary for research and factual recall, as opposed to those who were vocationally trained as performers, had a greater aptitude for the work. This legacy endures amongst the sought after qualities for prospective Explainers and amongst other things, current recruitment of NMeM Explainers requires the following skills and experience:

Experience

- Worked in audience/visitor oriented environment in a front-facing capacity
- Presented to groups of people in formal and/or informal situations
- Performed or acted in a dramatic context (desirable)

Skills & knowledge

- Excellent presentation and/or performance skills
- Excellent written and oral communication skills
- Excellent ability to remember and recall factual information and transfer it to others in an engaging manner

(NMSI: 2012)

In some respects these requirements recall the skills and experience of certain of the nineteenth-century RI scientists. There is less emphasis in the contemporary picture on content expertise (i.e. scientific capacity), but nevertheless the demand for skill in recall and recounting factual information is present, and this was obviously a critical element in the RI lecture-demonstrations. Michael Faraday, as illustrated in Chapter 2 (2.5), actively sought to improve his performance technique through formal elocution lessons and informal peer-review sessions with his associates, and as I also suggest in that chapter, a version of vertically transmitted training was established amongst the three core subjects Davy, Faraday and Tyndall. It can be said then, that amongst the nineteenth-century RI scientists there existed a commitment to developing proficiency and expertise in performance, the like of which can also be seen in current Explainer recruitment profiles. The shape of the Explainer role is changing however, and with the previously described shift in emphasis towards STEM, the Learning team at NMeM will need to be creative in its use of perfomance as an interpretative tool. Also inevitable has been the development in Explainer recruitment, that the previous requirement for 'Knowledge of aspects of photography, film, television, radio or new media' (NMSI: 2012) has, at the beginning of 2016, been replaced in the Skills, Knowledge and Relevant Qualifications section with:

- Evidence of an interest in a broad range of science and technology subjects
- An ability to communicate scientific or complex information in an accessible and engaging manner
- An aptitude for understanding the basic scientific principles communicated

(Cascade: 2016)

This vision of the Explainer role is a far remove from its early iteration in the form of the Guide Lecturer, with its more didactic, top-down approach, and illustrates the significant development of the role as a reflection of cultural tastes and conventions. In this way, the Explainer is much less of an expert than the Guide Lecturer might be regarded, but far more of a key player in a bigger strategic picture to gain the market share of audience participants. Their role in helping to achieve success in this respect should not, I suggest, be overlooked, although as I explore later in this chapter, there would need to be a shift in perceptions of the status and value of the role at a senior level for this to be properly achieved.

5.4.1. Defining performed explaining and considering embodied knowledge

In Chapter 1 (1.4.4) I conceptualised the SMG Explainer role as combining two core elements: *facilitation*, and the delivery of *performed explaining*. I suggested the use of this new term in order to enable a more accurate description of SMG Explainer presentational practices and to distinguish these from the broad, and predominantly historical content that constitutes the more typically used description 'live interpretation'. Here I expand on the notion of performed explaining and my use of it as a term to describe Explainer performance-centred work. In order to privilege the performance quality of Explainer work I also highlight here the ways in which aspects of performance can be regarded as having been embodied and transmitted from nineteenth-century practices.

The SMG Explainer has an explicit brief to engage visitors through the use of a variety of performance-related skills. I suggest that the requirement for Explainers to engage audiences in such a way exceeds the more straightforward function of simply telling audiences about facts related to objects and themes. ScM markets one element of its Explainer-delivered programme as ‘electrifying shows and lively demonstrations’ (Science Museum: 2015c) that explain the physics behind some of the interactive exhibits in the interactive galleries, and similar examples of this vivid marketing speak can be found repeated across the sites. The intended effect is to attract audiences through an expectation of entertainment and fun alongside learning. While there is no attempt at the creation of a character or fictional role in the science shows the content is scripted and makes varying uses of projections, music and props to deliver an event that is peppered with instances of audience participation and practical demonstrations. Learning about explosions, rockets, forces or light in a fun and participatory manner is key to the form of the science shows, and they provide a fast-paced and highly visual introduction to the various scientific concepts that form the bases of the museums’ collections. They are presented with an atmosphere of the impromptu and improvised – despite the fact that given the risky nature of some of the experiments being performed, they can be anything but spontaneous.

In proposing the term *performed explaining* to describe these presentational aspects of the Explainer’s work, I seek to augment perceptions of the role in order for it to be regarded with due consideration given to the necessary complexities of performance skill. Polly Williams’ (2011) revaluing of the work of those in the industrial museum context who communicate the stories and histories through live presentation - she uses the term *performed interpretation* – paves the way for a similar treatment of Explainers in a science museum context. There are of course some significant differences between the work of the interpreter in a living history museum and an Explainer in one of the museums of the SMG: the former is frequently dressed in period costume, often delivers in a reconstructed site or room typical of the period or perhaps in an actual historical site, and may appear as though they are acting in order to convey the illusion that the visitor has entered a past time or world. Central to Williams’ adoption of her new term performed interpretation is the notion of a range of transformations that it can effect, and thus, she argues, assist museum managers in their understanding of ‘what works’ for visitors. Of these transformative qualities, two are of particular worth when considering a revaluing of the Explainer performance work: altering space and time, and for the visitor, moving between the roles of spectator, learner, pilgrim, participant and audience (Williams 2011: 22).

Thinking about the first of these, altering space and time, Williams elaborates on the ways in which performed interpretation in the living history museum enables visitors to temporarily inhabit the past and how performance in this context can be seen as:

> the act of retrieving history [that] may produce insight and recreate the experience (…) Although the museums use their authentic materiality to suggest that it is possible to "revisit" the past, it is not the material past that we visit, but an experience based on memories and emotion which is a differently authentic form of reliving.
>
> (Williams 2011: 40)

Explainers working in the SMG museums are not consciously attempting to revisit or recreate the conditions of science lecture-demonstrations from days gone by in order to replicate the experience for visitors, they perhaps have not even considered the similarity. They do not wear period costume and neither is there any attempt to recreate an 'authentic' setting for their presentations – they are not attempting to portray a representation of Davy or Faraday, for example, at work in the lecture theatre of the RI. In this sense their purpose is distinct from that of the living history interpreter. However, I propose that they do unconsciously achieve this in some form, connected to the inherent traces of those nineteenth-century traditions that have survived through the processes of vertical transmission and restored behaviour. In Chapter 3 (3.6.2) I argued that elements of the performance behaviours associated with the nineteenth-century lecture-demonstration form re-emerged, through embodied knowledge practices, in the lectures of ScM Guide Lecturers as a result of their 1954 observation(s) of Lawrence Bragg's RI Christmas Lectures. Chapter 4 extended this idea to suggest that, particularly through the process of vertical transmission (see 4.7), elements of those practices lingered, to re-emerge in a less consciously performance-centred way via the assistants and helpers in the Discovery Rooms and Test Beds. With the development of Launch Pad at ScM, I showed (4.6.2) how the urge towards performed demonstration resurfaced once again as Explainers instinctively began to perform them (MGR1/SCM/15). In this way it is as if the earlier form is reconstituted or restored in the contemporary moment. The ScM Explainer science shows that were performed in the Launch Pad theatre until it closed on 1 November 2015 and the subsequent iterations of this form as they have emerged at MSI and NMeM during the first part of the twenty-first century, should be seen as the direct descendants of the lecture-demonstrations that began at ScM in 1955, but as I have suggested, can also be seen as having roots in the practices of the nineteenth-century lecture-demonstrations at the RI. Examples of these wider iterations include *Light, Cameras, Action!* (NMeM) and *Revolution Manchester* (MSI), both of which incorporate demonstrations and involve audience participation in pacey, entertaining presentations. My own participation as an audience member at both of these shows and also at *Flash, Bang, Wallop* and the *Rocket Show* at ScM, highlighted for me the fact that performance behaviours and actions are repeated and recurring across the sites. This is partly due to a deliberate intention on the part of the SMG to create a brand essence that encapsulates the atmosphere of its Learning offer (see 5.5) but can also be understood in terms that recall Performance Studies concepts of 'restored behaviour' (Schechner 2006), and the 'recycling' and 'haunting' (Carlson 2003) of contemporary performance tropes by those from the past.

MGR1/SCM/15 recollected that there was a period of time, around the late 1980s, before the Explainer team became properly established and organised when they started to instinctively present demonstrations to audiences:

> The Explainers started doing them by themselves to be honest, there were a couple of Explainers I worked with early on that had done performances in the old gallery, the first gallery, but they were haphazard, they weren't on a timetable, there was no training… they did bubbles and I think they did a water rocket, but it was pretty much left up to them to do it, it wasn't at all managed. And then when we moved to the new gallery upstairs (…) there wasn't actually a performance space, so they'd wiped performances from the menu, so there was nowhere that you *could* perform and no facility for it, but they're funny the Explainers, you know, we just started doing them – we found a corner and we just started doing them, and of course crowds formed and the public loved it. (MGR1/SCM/15)

This reminiscence reveals an intuitive capacity for performing demonstrations, the type of which has remained in the Explainer presentation repertoire to the present day. Significantly there is a sense that traces of the early performances referred to in this recollection found their way into later practices - they were reconstituted or recycled. They exemplify Schechner's assertion that our behaviours are multi-authored and constructed via the many layers of social interactions and rituals that have occurred both in the recent and more distant pasts (see 1.5.1). His conceptualisation of individuals as the 'synthesizers, recombiners, compilers or editors of already practiced actions' (2002: 35), suggests that there can be no entirely new and unique behavioural inventions. In this sense, it is as though aspects of the practices adopted by the Guide Lecturers after their witnessing of the December 1954 RI lectures, were re-emerging in these haphazard, semi-improvised gallery performances in the late 1980s. The lineage that I have constructed and illustrated in Chapters 3 and 4 whereby behaviours have been passed on amongst the Guide Lecturers, and then via GBL Wilson (see 4.4), found their way into later assistant-type roles, can be seen as the line of transmission, or to return to a previously-used metaphor, the 'slender thread' (see 2.3.2) that enables the re-emergence of these behaviours in the contemporary moment. The fact that these shows now follow a standard approach and are created in the museums across the SMG with the use of a 'Style Guide' (EXTL1/MSI/14) that ensures continuity of form, illustrates how a form of horizontal transmission can now be seen emerging from ScM itself out to its sister sites (see 5.5.1).

Audiences of these shows are then able to experience a feeling, or an atmosphere, that may be described as being similar to the atmosphere of the nineteenth and early-mid-twentieth-century lecture-demonstrations. The ways in which this is achieved in the SMG science shows are thus:

- through the setting up of the space: the audience seating is arranged in a semi-formal manner, in rows facing the performance area. At ScM these shows occurred (until November 2015) in the black box-style studio theatre space that was part of Launch Pad, with a stage area that is slightly raised. At MSI, they take place in the *Revolution Manchester* gallery space, again on a raised platform. At NMeM they are variously sited in *Gallery Two*, a temporary exhibition space (*Figure 5.2*), the rotunda area of the Kodak gallery or elsewhere in the museum as a 'best fit'. Although by no means exact replications of the conditions at the RI lecture theatre, these science shows have echoes of that presentational form as well as that of ScM mid-twentieth-century lectures (*Figure 5.3*). They typically feature a table at the front with the various necessary props laid out upon it, again mirroring the arrangement for the RI and early ScM lecture-demonstrations. During these shows the audience may temporarily forget that they are in a museum. EXP7/NMeM/15 observed that 'you want [audiences] to be completely immersed' in the performance, suggesting a momentary pausing of the actual conditions of time and place, and an event which the audience and Explainer experience together.

(*Figure 5.3*) NMeM Explainer performing a demonstration as part of the *Horrible Science*-themed holiday programme

(*Figure 5.4*) Mr van Riemsdijk giving the Christmas Lectures *Science by the Fireside*, 1963-64 at ScM. Mr Moody sitting in background. © *Science Museum/Science & Society Picture Library*

- the inclusion of 'experiments': demonstrations of scientific phenomenon that the presenter has already prepared. The audience are not witnessing the actual creation of new knowledge, but it is presented to them as though this is so – they may be asked to predict what they think will happen as a consequence of the presenter mixing two liquids or firing a canon; the Explainer may react as if to convey the impression that what they have just performed was for the first time in order to heighten the levels of excitement in the experience for the audience.

A good example from NMeM can be found in its science show *Light, Cameras, Action!* which focusses on the technology and use of light in cameras and was created in March 2014 as an early response to the new STEM-emphasis (5.2.2). Independent science presenter Steve Allman was commissioned to create the show and NMeM Explainers were trained by him to deliver it.[103] Significantly, Allman began his career in 1991 as an Explainer working in Launch Pad. On his own company website he describes how:

[103] Allman declined to be interviewed as part of this research and did not consent to be observed during his training of Explainers to deliver the show.

> By 1993 I was one of the pioneering presenters of live Science Shows using exciting and memorable demonstrations to inspire a generation of children (and adults!). I went on to produce many of the classic shows that you will still see at the Science Museum today
>
> (Allman: 2014)

The choice of Allman as the creator of NMeM's first Explainer-led performance showcasing their response to the new STEM focus is revealing and suggests an intention to consciously emulate performance styles and practices that were already well established at ScM. Even if this were not a deliberate intention, that Allman was immersed in ScM Explainer performance practices facilitates an important connection between ScM established practices and the new practices emerging at NMeM. Allman manifests strengths in 'repertoire' as Diana Taylor conceives it, as that which 'enacts embodied memory: performances, gestures, orality, movement, dance, singing – in short, all those acts usually thought of as ephemeral, nonreproducible knowledge' (2003:20). He would carry with him the residue of the performance behaviours from his experiences of presenting and creating them at ScM and, this would inevitably impact on the ways in which he approached the development of a science show at NMeM. As discussed (1.5.1) the transmission of these behaviours as understood by both Taylor (2003) and Schechner (2006) allows for the incorporation of changes and additions as new participants appropriate the embodied knowledge. The form, structure and Explainer performance behaviours evident in *Light, Cameras, Action!* are, unsurprisingly given its heritage, noticeably similar to those of the well-established science shows at ScM, which in turn, as I have shown in the subsequent chapters, can be traced to previous iterations of the Explainer role and back further still to the nineteenth-century RI lecture-demonstrations. Focussing particularly on 'gesture' as one of the 'ephemeral acts' in Taylor's list of what is included in the repertoire, the following sequence of images illustrates how one particular gesture using the arms has been associated with the act of science demonstrating and explaining for an extended period. Together, the images may be viewed as a 'physical storyline' (Pitches 2011b: 141) depicting, the transmission of a particular bodily practice or gesture.

(*Figure 5.5*) Sequence of images constructed to illustrate the reconstitution of gesture (images 2 and 3 © *Science Museum/Science & Society Picture Library*)

The four images are:

1832 - illustration depicting the ideal 'deportment of a speaker' (Smart:1832)

1936 - Mr S Groom, ScM Guide Lecturer delivering a gallery lecture

1966 - Mr J van Riemsdijk, ScM Guide Lecturer presenting a theatre lecture

2015 - NMeM Explainer performing *Light, Cameras, Action!* in the Kodak gallery

The first image, taken from the 1832 third edition of Benjamin Smart's practical manual on elocution and public speaking, suggests the ideal pose to be assumed by a speaker. Smart advises that once the speaker has established a comfortable atmosphere 'he will find an inclination to bring his hands into use in order to enforce or mark the progress of the enumeration in the sentences (…) the action least awkward to himself will be one that employs both hands' (Smart 1832: 91). I have already described how Michael Faraday took private lessons with Smart in order to improve his own presentation (2.5), and it is not unreasonable to assume that in performance, Faraday would have followed this advice, using his hands and arms to aid his delivery in the manner shown. It is, of course, commonplace for speakers today to gesticulate and utilise hand gestures to emphasise their points in a range of situations, but of interest here is the specific repetition of the gesture, with 'changes and additions' (Taylor 2003; Schechner 2006), in the context of lecture-demonstration/performed explaining at the RI-ScM-SMG. As articulated (1.5.1) the repetition of the gesture in this context can be seen as an instance of 'againness' (Taylor 2003: 21), an act of behaviour that transmits the 'communal memories, histories, and values from one group/generation to the next' (Taylor 2003: 21). This elaboration offers a clear example of the practical application of the selected theories to the SMG Explainer and its antecedents.

The range of performed explaining presented by SMG Explainers falls somewhere *in between* the real world and fictionalised events. Activities occur in the real context of a visitor's trip to the museum and their subsequent actual engagement with its content and collections, usually highlighting factual scientific concepts and properties. Yet they are sometimes framed using fictional events or situations and utilise pre-determined scripts, stage directions, gestures, facial expressions and voice in order to consciously engage the audience and create a particular intended effect. In this sense their work can be seen as already responding to the previously cited (5.3) question from the *Transforming Practice* report (2015) exploring science capital: 'How can I make an emotional and relevant connection with an audience of 100+ people with different backgrounds?' In order to respond to the challenges of making relevant and emotional connections with audiences the SMG Explainer routinely assumes a hybrid role of self–expert-character-facilitator, and in performed explaining the emphasis is firmly on the first three of these. This interpretation of the role maps onto the second of Williams' notions, identification of how the visitor moves between the roles of spectator, learner, pilgrim, participant and audience, but instead I am focussing on the different modes that the *Explainer* moves through. Where Williams centres on notions of *interpretation*, my focus is on notions of *explaining*, and as such I highlight the challenges for the provider (Explainer) rather than the receiver (audience).

Thinking of the Explainer role in this hybrid way represents a marked evolution from its more straightforward antecedent, the Guide Lecturer, which it could be said involved only the self-expert elements. In this way it can be argued that the contemporary SMG Explainer role is the most complex and demanding iteration of the various predecessors in the lineage to date. Anthony Jackson and Jenny Kidd's (2008) findings arising from the *Performing, Learning and Heritage Project* included the observation that an essential skill for museum interpreters is the ability to easily switch back and forth between the modes of 'actor-teacher' (2008: 84). Concluding that the museum role was highly demanding, requiring high levels of factual knowledge that could be swiftly recalled, they also suggested that when performing, interpreters needed 'an awareness of the audience and the degrees of attention and understanding they are displaying from moment to moment' (2008: 84). In this sense it is the *performance* element that further augments the role, requiring the Explainer to do much more than present lectures or recount factual information, and as such, a new term to categorise the performance work that they present – performed explaining – is a valid proposition.

5.4.2. Hybridity in the contemporary SMG Explainer role

Bert O. States' phenomenological theorising of the actor's presence offers a useful way of further considering the notion of hybridity in the Explainer role. In his essay *The Actor's Presence – Three phenomenal modes* (in Zarrilli: 1995) States separates the layers and voices present in the actual world of the theatre from the fictional world of the play thus:[104]

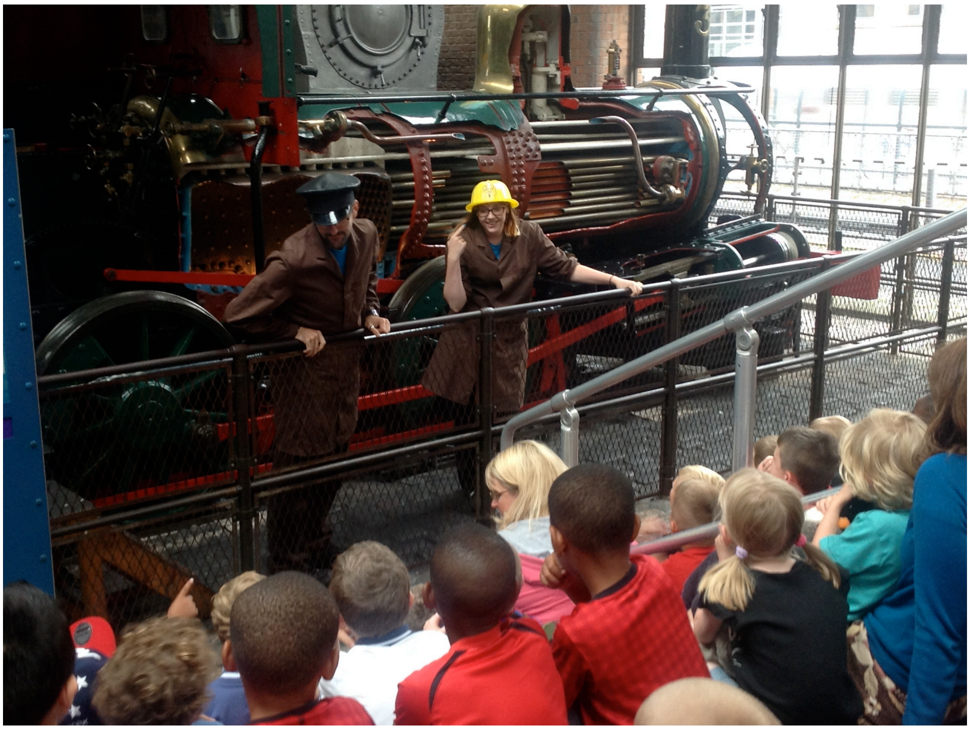
[104] States attributes his adoption of the terms 'acting event' and 'enacted event' to Jiri Veltrusky in his essay 'Contribution to the Semiotics of Acting' (1978).

THEATRE (Acting event)			**PLAY (Enacted event)**	
Actor	=	I	=	Character
Audience	=	you	=	Other characters or self
Character	=	he (it)	=	Absent characters or events

(States in Zarrilli 1995: 23)

While the 'Play' column is self-explanatory - characters in a play speak to or about each other or themselves, as we do in life – States suggests that the 'Theatre' column requires that we shift our perspective when considering the speech process in use. He argues that it is the actor, or 'I', who speaks to the audience, 'you', *about* the character, 's/he', that is being played. This articulation - that it is *about* the character, not *as* the character, positions the 'I' of the actor, and the 'I' of the character they play, as speaking with separate voices. In this sense the actor is a type of storyteller. The actual world of performed explaining can, I suggest, be viewed in similar terms to States' actual world of the theatre and there exists a level of enduring audience awareness of the use of framing devices in order to convey meaning – performed explaining never slips into the realms of Play, as might be found in some forms of live interpretation, particularly in a heritage context. States cautiously observes that in suggesting that the actor 'is always slightly "quoting" his character' (1995: 23), it is not as part of a consciously theatrical style, as with Brechtian performance for example, but rather that there remains the essence, or 'ghost of a self' throughout the performance. This *essence* of the actor, performer or *Explainer* themselves is foregrounded in performed explaining - the Explainer deliberately builds the other aspects of their performance around their real-life, actual character or identity. The MSI Explainers in particular work with this blend of self–expert-character-facilitator, although here there is sometimes a distinct heightening of the character element. Following States' notion of the actor 'quoting' her character it can be seen in the MSI presentations that whilst portraying a character, who with the exceptions of *Engineer Eric* and his pupil *Fireman Fred* were actual living people, Explainers explicitly adopt a critical distance from them. For example, in *Inventors Wanted*, the Explainers refer to each other by their own names and also by the names of the characters they play at different moments within the same piece. It is clear that they are Explainers, but it is also clear that they represent a character at certain moments during the same piece as well.

(*Figure 5.6)* Costumed MSI Explainers performing *Inventors Wanted.* The Explainer on the right is representing real life Salford-based inventor Hans Renold



(*Figure 5.7*) Costumed MSI Explainers performing *Engineer Eric's Difficult Day*. Explainers portray fictional characters Engineer Eric (L) and Fireman Fred (R)

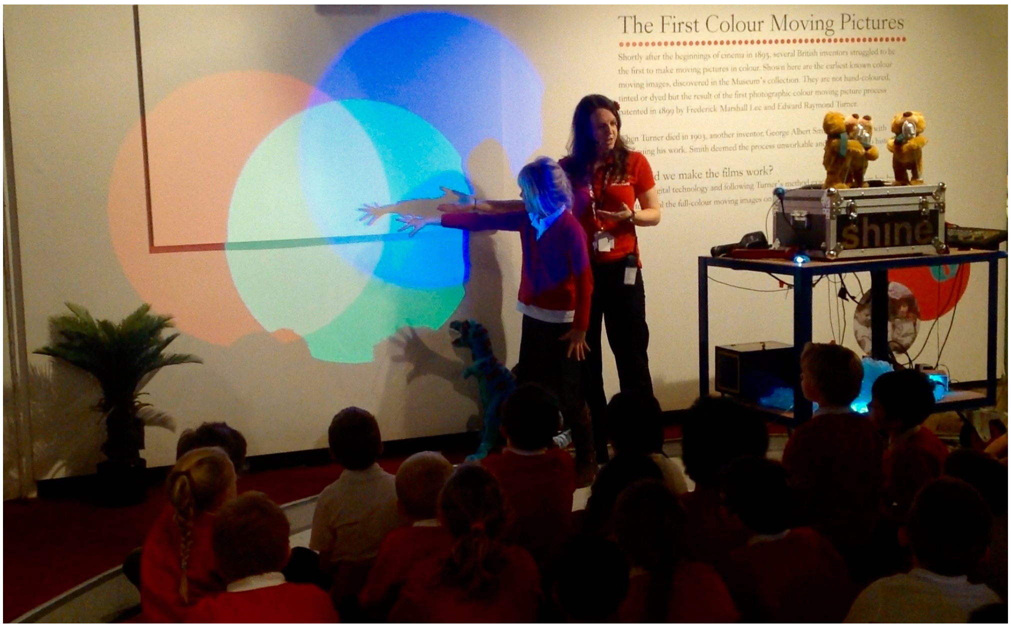
States further describes three 'pronominal modes' (1995: 23), reference points that help make sense of the shifting relationship between actor and audience during performance: Self-expressive, in which the audience can recognise and admire the performer's technical skill and concentration in playing their role; Collaborative, which facilitates moments of the actor's recognition of the audience; and Representational, the temporary acceptance of and belief in the fiction of the character and the play. Of these three modes the collaborative mode is most useful to the discussion of performed explaining. States' own observation that his modes do not 'have anything at all to do with style' (1995:24) enhances their application to any acting practice rather than limiting them to one period or method. He posits that the collaborative mode is typically and particularly found in comedy. This mode 'breaks down the distance between the actor and the audience and gives the spectator something more than a passive role in the theatre exchange' (1995: 29), something that can be seen in SMG examples of performed explaining where there is typically a requirement that audiences are directly addressed and encouraged to be responsive. In this sense, the SMG examples represent an extended version of States' mode since he prefers 'to retain the strict sense of "you" as the *spoken to*' (States 1995: 29 italics in original), rather than a more inclusive sense of 'we'. States suggests that in its purest form the collaborative mode is akin to the relationship between performer and spectator that is established by the comic aside. But his inclusion of Peter Handke's play *Offending the Audience* as an example of carrying the 'collaborative mode to its intricate extreme' (1995: 32) due to its reduction of all that is typical of theatrical performance down to only the structure of the actor/audience relationship, implies that States is receptive to variations on his theme. Indeed, he declares that his 'treatment of [the] three modes as if they occurred *purely* is strictly a convenience of definition' (1995: 35 italics in original).

In terms of exemplifying the collaborative mode then, comic elements are often intrinsic to Explainer performances, allowing for establishment of a relaxed and informal atmosphere whereby the Explainer can encourage audience participation, a crucial element of much performed explaining. For example, in *Inventors Wanted* spectators are encouraged to participate at different moments in the performance either as a group (see *Figure 5.7* depicting spectators joining in with Explainers to demonstrate the circular movement of a bicycle roller chain), or as individual volunteers required to undertake an activity to help further the progress of the show or demonstrate a particular scientific concept (*Figure 5.8*).

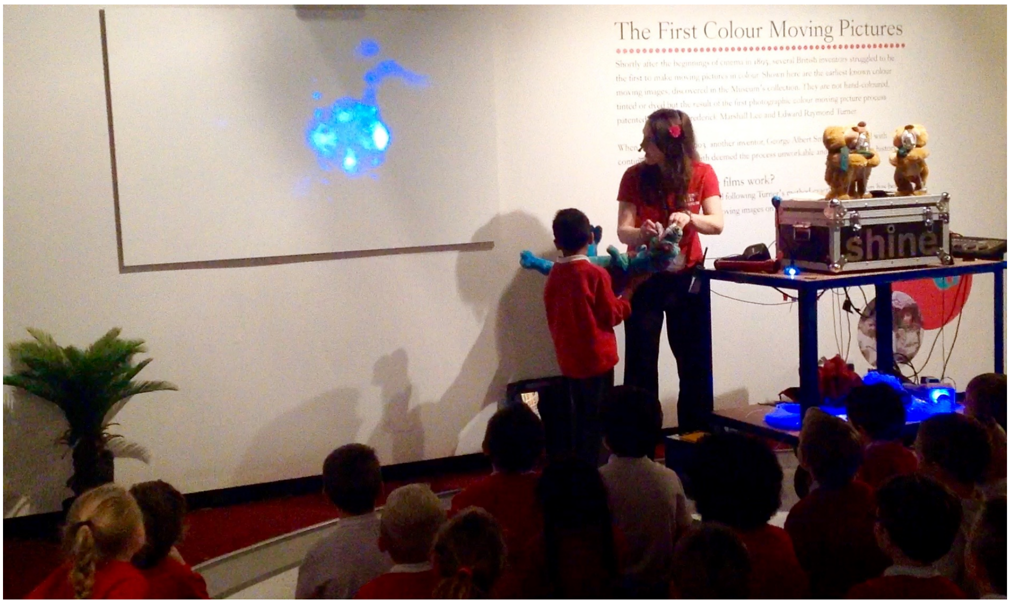
(*Figure 5.8*) Costumed Explainers and spectators collaborating in a moment of performance in *Inventors Wanted*, MSI

(*Figure 5.9*) MSI Explainers delivering *Inventors Wanted* with the help of an audience volunteer

The use of audience volunteers is essential to NMeM's most recent Explainer science show *Light, Cameras, Action*! Here the Explainer frequently calls on volunteers to assist with demonstrations (*Figures 5.9, 5.10*) and manage items of props, indeed it would be impossible for them to complete the performance in its current form without their contribution since it relies on this interaction.



(*Figure 5.10*) NMeM Explainer delivering *Light, Cameras, Action!* with the help of an audience volunteer



(*Figure 5.11*) NMeM Explainer delivering *Light, Cameras, Action!* with the help of an audience volunteer

One way in which the element of Explainer 'self' is commonly highlighted across the sites is through their being encouraged to invest their own personalities in their 'presenter' persona for a science show. Team leaders at MSI for example, actively encourage Explainers to allow their own personality to influence their interpretation of a script, describing how the script for a science show does not have to be followed word for word, but instead it provides a *suggestion* for the 'kinds of words you might use' (EXTL1/MSI/14) and a defining overall structure for the piece. A similar attitude was evidenced during the training I observed in January 2013 of NMeM Explainers being taught by visiting Explainers from ScM to deliver a new KS1/2 storytelling show *The Not So Sleepy Hedgehog*. The two Explainer trainers, confirming that they used the same approach as they would with Explainers at ScM, encouraged NMeM Explainers to make the script their own, ad-libbing if desired, on condition that the key scientific principles were correctly introduced and the central narrative was followed. One of the trainers explained the need for the key points or key vocabulary, what they described as 'islands', to be consistent and that Explainers could 'return to them as they needed' (EXP2/SCM/13). They also observed that, as with any 'role in the professional theatre, you would talk to your partner beforehand about how you were going to play the scene' in order to agree playing styles and approaches, although in practice, and especially given the dense rota system that Explainers work to, it is questionable as to whether they would always have the opportunity to do this. EXP2/SCM/13, who trained as an actor, also observed that by not sticking rigorously to the script Explainers were able to 'learn the content. They need to say it in their own words as this makes it possible for them to understand it'. These observations were echoed by the reflections of one of the NMeM trainee Explainers:

> It helped that there is a fluidity to that script, erm, and it isn't important necessarily, the exact words you use so long as you get the crucial little bits, there were certain little bits, little segments basically on each page, and so long as you got that bit right the rest of it was very free-form, very flowing. And as a result of that we all got it within two days, we all knew it. (EXP9/NMeM/13)

At MSI, once a new Explainer has watched a seasoned Explainer deliver a particular show they can appreciate its style and approach alongside some examples of text and jokes they might use. However, as a team leader there explained, Explainers are 'not expected to actually go and do that joke, [they're] expected to think, "oh well, what *my* character would do - **which is just an extension of myself** - my character would say *this*"' (EXTL/MSI/14). This notion of the 'character as an extension of oneself' is central to the complexity of the hybrid performance registers used by the Explainer that can be understood in the following ways:

Register	**Demonstrated by Explainer**
SELF	Their real-life personality which they draw upon to inform all the layers of their Explainer persona that they present to an audience
EXPERT	They provide the audience with the necessary factual information to help them make sense of what they are seeing
CHARACTER	Sometimes they will represent an explicit character, typically in a storytelling event e.g. *Inventors Wanted*
FACILITATOR	In certain activities, they must assist the audience to achieve or to participate in, some practical outcome, such as mask-making in *Shadow Science* (NMeM)

(*Figure 5.12*) Table showing Explainer performance registers

In addition to these they also sometimes adopt 'type' registers or modes that they move through within the same piece, such as in NMeM's Light*, Cameras, Action!* where the Explainer uses three different registers resembling the modes of teacher/game show host/children's TV presenter as the performance progresses. At the same time, as with all SMG science shows, they operate computer and projection equipment and perform demonstrations, often using everyday household items. It is a challenging activity and the support of the audience - both in terms of actually assisting with the content, and remaining on the side of the Explainer if/when the unexpected occurs - is critical.[105] Although it would be

[105] During my observations of Explainer presentations at all sites it was not uncommon for equipment to fail or for several attempts at a demonstration to be needed. This was particularly true of *Light, Cameras, Action!* where the link between the endoscopic and

simplistic to attempt to shoehorn performed explaining into States' theoretical framework and suggest a perfect fit with the collaborative mode, it does provide a useful model of performance for understanding and articulating the complexities of the ways in which the Explainer interacts with audiences. Understanding of the hybridity of the role as articulated in this section further highlights the role's complexity and intensifies the need for its performance-centred work to be categorised as something other than 'live interpretation', as well as potentially instigating a revaluing of its status (see 5.6).

5.5. The homogenisation of the Explainer

One of the Pan-SMG 'Key Deliverables' by 2017 as articulated in its 2013-17 development plan is to ensure that 'SMG learning products and programmes [are] shared across sites' (Science Museum Group 2013b: 5).[106] Whether it is the Group's explicit longer-term intention to smooth out existing operational differences and create a Learning brand essence that is instantly recogniseable across all the sites, is yet to be seen, but it is true that certain Explainer science shows that have been tried and tested at ScM itself have sometimes found their way, unchanged, to the northern sites.[107] Such practices can, on one level, be seen as analogous with Dan Rebellato's notion of 'McTheatre' (2009: 40). By alluding to what is amongst the most iconic of all global brands, Rebellato, somewhat disparagingly, highlights the globalisation of the 'mega-musical' – the recreation of an identical facsimile of a production wherever it may be staged in the world. He exemplifies both the 'good and bad' (2009: 41) elements of this approach: the good being an attempt to ensure that no matter where audiences might be they can access the same high quality theatre experiences as those who were present at the originals; the bad being a reduction in the uniqueness of that experience, the creation of a mass-produced consumer *product*. Both aspects have some affinity with this recent aspect of the SMG approach to its Learning-led performances. The

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thermal imaging cameras and the computer frequently caused problems for the Explainer as they demonstrated its use. In these instances the Explainer is required to continue talking to and entertaining the audience whilst troubleshooting the technical problem.

[106] Michael Terwey, Head of Collections and Exhibitions (NMeM) suggests that this approach also exists in other teams, notably exhibitions. The fact that Learning is centrally-managed may have made this easier to implement than with certain other teams, but the ambition for a common SMG approach is present (Terwey: 2016).

[107] For example, NMeM launched *The Not So Sleepy Hedgehog* storytelling session in Spring 2013 after ScM Explainers trained NMeM Explainers in its delivery.

globalisation of the SMG's Learning brand has already begun. Its Annual Review 2012-13 opens with a diagram showing 'SMG Influence Around the Globe 2012-13' and an arrow pointing to China is accompanied by the caption:

> The SMG Learning team delivered science shows to audiences of 7000 people at the Science Alive festival in Hong Kong and southern China.
> (Science Museum Group 2013c: 2)

Similarly, the following year's Annual Review begins with the same diagram, only in this instance references to SMG Learning activities undertaken in Hong Kong are joined by references to work completed in Malta and South Korea. Significantly, in his critique of the role of the director of McTheatre-style productions, Rebellato identifies how s/he uses 'little of their training or experience, as they are merely supervising the reconstruction of a show that already exists' (2009: 44). There are of course differences between the two approaches, not least, as previously described, there is scope, encouragement even, within the SMG approach for Explainers to mark their interpretations with their own personalities. Nevertheless, there are also resonances with certain of the training and preparation approaches used for Explainers in the SMG, and these point to an increasing organisational valuing of a role-type that can be regarded as defining its brand essence, regardless of which of its museums it is featured in.

5.5.1 Common approaches to training and models of verticality

During my own observations in January 2013 of ScM Explainers training NMeM Explainers to deliver the ScM-devised storytelling session *The Not So Sleepy Hedgehog*, a clear structure of 'watch and repeat' emerged as the primary training method. It was evident that the product – the performance itself – was fixed and what was required of the Explainer was the committing to memory of the text, or a close version of it with embellishments to reflect individual personality, and the exact replication of the simple physical gestures used to reinforce the science in the show (i.e. light cannot pass through solid objects). The training method of a peer-led 'watch and repeat' structure is frequently used for Explainer training at ScM and as I have observed, also at NMeM and MSI. One of the ScM Explainers involved in the training of NMeM Explainers commented:

> Who trains you is the one who influences you (...) By having someone who has delivered the show train it, they can pass on vital information, especially technical (...) you learn it much better if someone can talk you through it…the training at the Science Museum is heavily peer-led (…) so the jokes I teach get passed on. (EXP2/SCM/13).

Such a description recalls the previously discussed traditions of vertical transmission amongst the RI scientists (2.3.1) and ScM Guide Lecturers (3.6.1), and some unpicking of EXP2/SCM/13's observations exposes echoes of those traditions:

- They confirm here that the trainer is usually someone who has themselves performed the content that they then teach. Ian Watson's (2001) definition of vertical training involves the passing on of specific skills and embodied knowledge from master to disciple with the aim of recreating the master's performance. Although not strictly utilising a 'master', the SMG training structure usually involves an experienced, sometimes more senior figure (for example a Team Leader), who passes down the information and skills. In all the examples I witnessed, this figure first modelled the performance behaviours that were necessary, for these to be then emulated by the trainee 'disciple'.
- EXP2/SCM/13 highlights the transference of technical skill and information, echoing Watson's observation that vertical transmission concentrates on notions of sustaining specific skills and practices.
- By highlighting the peer-led orientation of ScM's approach, EXP2/SCM/13 illustrates the effect this has on the possibility of an ongoing lineage – 'the jokes I teach get passed on'. When the time comes for EXP2/SCM/13's 'disciples' to train the next generation of Explainers, they will naturally pass on the same skills and content, contributing to a continuation of the vertical transmission process, and sustaining the progression of the Explainer lineage.

There are also elements here of what could be described as *horizontal* transmission, brought about by the close proximity in status of the master/disciple roles. The training structure at some of the other sites, notably NMeM, is typically more immediately peer-to-peer. While there has been an Explainer team leader in place there since team structure changes in 2014, the current post-holder has not themselves been an Explainer and has no performance experience or skill. Thus the training at this site tends to occur amongst the Explainers themselves or else is delivered by visiting ScM staff, as in the example described above.

Current and former staff from the three sites and from across various levels confirmed this 'watch and repeat' method of approach to training:

> [The training] was just sort of repetitive…I think it worked. I think that's one of the best ways for anyone to learn something is to just repeat the thing, and watching it over and over again and you will pick it up. (EXP 10/NMeM/13)

> The training is just watching people do it and then also occasionally have them do it with different audiences so you'd learn to get that spontaneous element and adaptable element into it. (EXP11/NMeM/13)

> I think most of my training has been working with the Explainers that have been here for a while and they've delivered a talk, and I've watched, and then I've delivered it back to them and they've given me advice. (EXP4/NMeM/14)

> It's about working with other, more experienced Explainers, seeing how they do it. (MGR3/NMeM/13)

> The framework that we use is once a show's been developed and its ready to be trained to you, the first thing you would do is see it live in front of an audience, so you would immediately get a feel for the tone and the style because that is *so* important. (EXPTL1/MSI/14)

Since 2012 ScM has been rolling out its training practices at MSI: 'One of the positives of moving together with SMG Learning is that we do get presentation and advance presentation training through that network, which is fantastic' (MGR1/MSI/14). Prioritised in this *Presentation and Facilitation Skills Training* are physical and vocal exercises to build Explainers' skills. The physical element focuses on 'non-verbal' techniques, suggesting adopting a confident, neutral stance and highlighting the importance of physical presence.[108] Taught through the

[108] For example: 'posture/gesture – use big gesture – you are on a stage! (…) facial expressions – smiling, frowning (…) proximity – physical boundaries (…)

mnemonic device, PAMPERS, the current vocal training programme seeks to encourage Explainers to consider the impact of their voice:

> ***PAMPERS***
> **P**rojection
> **A**rticulation
> **M**odulation
> **P**ronunciation
> **E**nunciation
> **R**epetition
> **S**peed
>
> (NMSI Learning 2010:11)

Although it is not currently training Explainers at NMeM, as already discussed, it has done so at different moments in the past, both before and during this research period. The above testimonies of NMeM Explainers are evidence of the practice of an Explainer peer-to-peer training model currently in operation but it can be assumed that the residue of ScM training lingers on in the embodied skills and methods that they pass on. In this way the overall training approach can be viewed as model of vertical transmission that places ScM in the 'master' role and the other two sites as 'disciples'. This view is strengthened by the SMG's practice in recent years of promoting staff who have previously worked in lesser roles to senior managerial roles. For example, the current NMeM Director began their SMG career as an Explainer at ScM, as did the former Head of Learning North and the former SMG Director of Learning. In this way there is a culture of bringing up though the ranks those people who are fully inculcated in the institutional philosophies and practices, transmitting these on to subsequent generations.

Additionally, in this model there exist micro models of vertical transmission amongst the Explainer teams at each of the three sites, with the master role assumed by either team leaders, who were once Explainers (MSI and ScM) or Explainers themselves (NMeM). Finally, in an echoing of Watson's (2001) most explicit example of vertical transmission, the title 'Explainer' is also inherited by

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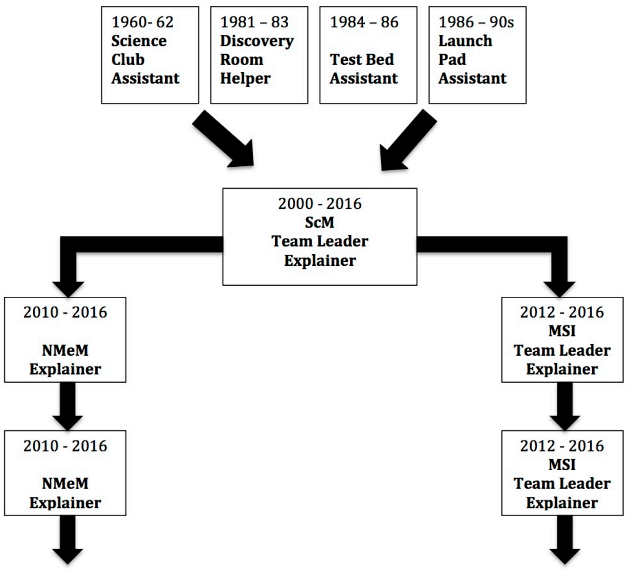
positioning/orientation – face to face, shoulders, head (…) head movements – nods, shakes; eye contact – how, when, how much?' (NMSI Learning 2010: 13).

each new recruit, suggesting that there are inherent qualities and skills that identify and quantify the role that can be passed on from Explainer to Explainer.

Equally significant in the move to extend common training and performance approaches across the sites is the fact that such practice contributes to the 'globalisation' and expansion of the ScM Explainer role beyond the realms of the ScM itself. This is an important step since it is in this way that the Explainer role at NMeM, and MSI, can also be seen as the descendants of the various iterations of the role at ScM in the 1980s, the Guide Lecturers and ultimately, the RI scientists. The fact that ScM extends its Explainer practices into the other sites, utilising ScM Explainer personnel in the actual transmission of those practices enables the extension of the lineage to incorporate those Explainers outside of ScM. The diagram (*Figure 5.12)* illustrates this transmission of practices, the downward arrow underneath the final NMeM/MSI boxes indicates that this transmission will continue for as long as the SMG practice endures:



(*Figure 5.13*) Diagram illustrating transmission of practices from ScM to other sites

Learning managers at MSI and NMeM are keen to emphasise the ways in which content developed at these sites might also influence practices elsewhere. They refer to the creation of a 'template' (MGR1/MSI/14) for Explainer-led shows that would enable a repeatable style and form to be adopted, enhancing the sense of familiarity and expectation for audiences. This notion of establishing and sharing a replicable format is echoed by a former NMeM Head of Learning and Participation, who describes a 'formula' approach to Explainer-led content being used:

> For the future, and starting from now, the actual sharing of content and sharing of shows and ideas is more of a collaboration, it's not about south giving to north, and north just digesting that because we've got to go with that, it's about what works for the site, and can we come up with something that's massively linked to our collections and our story, and is it STEM-related, and is it something which is portable? Could we take that show and could we give that to MSI? (MGR2/NMeM/14) [109]

If not strictly a Rebellato McTheatre-inspired model, then, the attitudes of recent Learning managers at the northern sites certainly represent a directional shift that embraces a uniform approach to the creation of performed explaining and will surely lead to a distinctive and definitive identity for Explainer performed work. At MSI this is already newly in place with the introduction of a 'Style Guide' that Explainer team leaders use to ensure that any new content conforms to the 'template':

> The style guide means that when we come to develop something new, we already know what it should feel like and it's just a case of the only bit we have to write is the content, whereas previously you'd be writing the content and you'd thinking about how it should feel, whereas now all that kind of stuff is taken care of. (EXTL1/MSI/14)

This approach is evidenced in a recent addition to the Explainer show repertoire at MSI, *Inventors Wanted*, an energetic and interactive performance exploring physics and the forces of motion and now perceived among Learning staff there as the model and standard for all future examples of performed explaining at that site.

5.6 Valuing the SMG Explainer role

It can be seen from contemporary practices that the contrast between current modes of Explainer performance and the unobtrusive (see 4.6.2), surveillance-like

[109] At the time of writing such transmission of practices *from* the other sites *to* ScM has not occurred.

presence of the 1980s could not be more marked. One NMeM Explainer inadvertently encapsulated this shift when describing the best thing for them about their role:

> [It's] being in the middle of a talk or presentation, performance or whatever you're doing that day, a demo, with every person's eye on you and you're telling them something which you know they're really, really interested in. That's amazing, that's a great feeling what ever age-group is listening, because you know when you've got, I suppose your *hold* of whatever you're saying to them, that's, that's the best thing - delivery. (EXP12/NMeM/14)

EXP12/NMeM/14's articulation of the excitement felt at engaging an audience suggests an entirely different view of the Explainer role that extends far beyond the earlier brief of providing a 'welcoming atmosphere' whilst 'keeping a low profile' (Stevenson 1993: 167). My interviews with Explainers and managers at NMeM and MSI when discussing the essence of the Explainer role uncovered similar attitudes to it that also highlighted this emphasis on a highly visible and proactive presence:

> We perform in the sense that we learn how to act in such a way that we demand attention, we draw people in and we bring them on a journey with us (…) do a fun experiment and then talk about how it works. The bonus is we get to include the audience so they participate in the explanation too. (EXP6/SCM/15)

> There's a lot more of a theatre element, performance element than perhaps I might have initially expected, but that really just played to my strengths (…) I think the ability to stand in front of people and talk and not be over-faced by it, I think that's something that we all share (…) if you can think on your feet and you're not going to be shy or nervous or whatever, I think that's probably the biggest skill. (EXP9/NMeM/13)

> When they step into the interview room you can sort of tell, and as Phil says, it's not the ones that are caught up on dates and facts, it's the ones that can freely talk to us, feel comfortable. You can tell the ones who perhaps wouldn't work in front of a big audience 'cos the other thing is you've got to be able to adapt to a huge, 200-people audience up in *Revolution Manchester* down to quite an intimate show down here. (EXTL2/MSI/14)

Discernable in these comments is a recurring theme of the imperative for performance confidence alongside the excitement of connecting with an audience or individual. The SMG's current preference for a bold performance style is partly connected with the response to changes in audience tastes and expectations, but it might also be seen as a move to tackle how perceptions of what was originally intended to be ‘unobtrusive’ might mistakenly have been perceived as ‘unapproachable’. John Stevenson’s PhD thesis (1993) highlights how in the very early days of Launch Pad the ‘helpers’ were present ‘for visitors to talk to about whatever they wanted’ (Stevenson 1993: 168). However, some visitors interviewed as part of his research did not seem to find them useful:

> AM: I think we noticed them, but didn't want them particularly to stand in our way. (…) AF: And it's quite different if you talk to someone in a white coat, once you got into Launch Pad, it's different.
>
> (Stevenson 1993: 168)

The white coats worn by helpers/Explainers at this time were also noted by the former ScM Learning manager who had started their career as an Explainer in Launch Pad:

> It was before the days of science communication really, so they just thought [wearing the white lab coats] was practical as in protecting, but also I think there were some other science centres round the world that had white lab coats that were you know, ‘science’, I mean it’s a ridiculous thing to do, but they wore white coats, there was nothing on them, no branding and you wore your name badge. (MGR1/SCM/15)

The symbolism of the wearing of the white coat is important since it carries connotations of scientific (and medical) expertise and professionalism. Although MGR1/SCM/15 states that in this context they were not intended to suggest this, the visitor interviewed by Stevenson appeared to identify them as some form of barrier to effective communication. Coupled with the instruction to be ‘unobtrusive’ it is possible that visitors were prevented from approaching the helpers and thus, they failed to serve any effective purpose. MGR2/SCM/15, who had also been an Explainer before rising to managerial level, reflected on this idea more broadly:

> People think that you’re going to be really intelligent, you know, they think you’re a real rocket scientist or whatever it is, and they’re scared to ask you something in case they look stupid, so when we talk about customer service, I don’t just mean opening doors and saying ‘please and thank you’, I mean about how you get around those kind of issues, you know, that you’re

> *not* super-intelligent, that you're *not* intimidating, but that people can ask you something and do you know what, it doesn't matter if it's the most stupid thing, you're not gonna laugh at them. (MGR2/SCM/15)

The contemporary SMG approach that sees Explainers mingling with audiences in galleries, wearing their distinctive but informal, brightly coloured red (ScM, NMeM) or blue (MSI) T-shirts, which in the case of MSI are printed with the caption 'Ask me, I'm an Explainer', and that favours bold, loud, attention-grabbing performances, enables audiences to regards them as accessible entertainers. Audiences are encouraged to participate in the presentations and to ask questions, and Explainers, who have been recruited largely for their approachability and communication skills, are primed to respond positively and enthusiastically. Explainers at all sites are then, working predominantly front-of-house as the public face of the museums and are tasked with ensuring that visitors have the best possible experience in terms of entertainment and learning, and importantly, that publics feel comfortable in approaching them. As noted in Chapter 1 (1.1.1) a former NMeM Learning Manager observed that Explainers 'have the ability to make or break a visitor's experience of the museum' (MGR1/NMeM/15). This crucial element of the role appears not to widely be recognised further up the museum hierarchy – it as though as expectations of the role have risen over the years, perceptions of its status have been downgraded. As it has become more visible, so too it appears to command less standing:

> The role is regarded as derisory on the whole, looked down upon by other departments, especially curators who think they are the only ones who know the subject matter. (MGR1/NMeM/15)

> [Explainers are] largely ignored! I think a lot of talent goes unrecognised. (EXP3/SCM/15)

> Exhibitions, VE and design have a pretty good understanding of our role and are appreciative of our work. Other teams, particularly middle managers and collections are generally dismissive and unaware of the amount and variety of work we do and its importance. Has this changed in four years? Not really. (EXP3/NMeM/15)

Recalling that one of the Explainer antecedents, the Guide Lecturer, appeared in the list of 'Senior Staff 1893-2000' (Morrison 2010:324-328) alongside such high-ranking roles as Museum Directors, Chief Curators and Heads of Collections that the contemporary Explainer role is now considered career entry-level is surprising. This is particularly so in view of its complicated presentation brief (see 5.4.2) and significant levels of expectation for delivering customer satisfaction. The Guide Lecturers were arguably considered to be more expert or knowledgeable in their fields and had a much greater emphasis on *teaching* through their lecture series than is found in the Explainer role. The role now is actively steered away from the notion that it will *teach* in a hierarchical and traditional sense, but instead is more concerned with inspiring, provoking and entertaining. The SMG's approach has followed 'new museology'-inspired trends in museum education, highlighted by Eilean Hooper-Greenhill when she explored how the 'museum has become an establishment for learning and enjoyment' (1994:2) and that 'entertainment in museums, however it may be presented, is used as a method of education, in the full knowledge that learning is best achieved in circumstances of enjoyment' (1994: 140). Others have also made similar observations (Jackson and Kidd 2008; Hughes 1998; Falk and Dierking 1997; Roberts 1997). But Explainers themselves and some managers have observed the schism between their own perceptions of their status and that of others, especially more senior roles:

> Due to the creative and child-focused performance elements, I feel we are viewed as 'not professional' by office workers for example. I think [other staff] don't know our role or how skilled and busy we are. (EXP1/NMeM/15)

> Often in whole staff briefings, our Director highlights the work of the Learning Department, which is very encouraging. I'm not sure how others view our work. Sometimes we worry that we are perceived as childish/ silly i.e. not as professional as people in other departments who are more office based (…) I think that the fact that we have to wear a uniform makes some of us feel that we are further down the hierarchy in the museum. Also, the recent change in contracts (for most of the Explainers) from Museum to Operations suggests that there is a division in the museum between back of house staff e.g. those working in Collections and Exhibitions - who are on the Museum contract, and front of house staff e.g. Visitor Experience, fundraisers, cafe staff, housekeeping and now the Explainers - who are on the Operations contract. I would say that there is a general feeling that front of house staff are not as highly respected as back of house staff and that, at any rate, there is a definite divide between these two groups, highlighted by the different contracts. (EXP2/NMeM/15)

> Although the Explainer role is regarded as crucial within learning - this isn't the case throughout the museum. Because Explainers wear a uniform, are within the galleries and are the entry point for the learning department- sometimes their level of expertise, knowledge and qualifications is not appreciated by others. (MGR2/NMeM/14)

> Higher-up people in the Learning team can also sometimes unfairly look down upon [Explainers] as mindless drones, completely forgetting that it's actually quite an amazing job to have. (EXP1/SCM/15)

These comments reflect a general view, particularly at NMeM, that Explainers are not appropriately recognised for the contribution they make and the knowledge, experience and expertise that they bring. It is certainly true that there is potentially a discrepancy between management perceptions of the role and that of those actually doing it. A former NMeM Head of Learning observed that 'Explainers are the crucial element within the department who bring the hard work and creative ideas of the developers to life for our audiences. The Explainers are the communicators, the "frontline", the face of the museum for visitors' (MGR2/NMeM/14). This observation does not reflect the responsibility for content production that the Explainers themselves claim to have. Indeed, it hints, rather simplistically, that the role is no more complex than exploiting the efforts of others and that by comparison, their job is undemanding. As I have explored above, notably in (5.4.2) an examination of the role from a performance perspective reveals that it is particularly complex and demanding in terms of the range of presentation registers and performance skills required.

It is notable however, that in some instances there has been a desire to utilise the Explainer role as an example of success and celebration. MGR1/SCM/15 recalled how 'when [ScM] realised how good they were at communicating, the press team would use them for TV (…) little by little they became representative of something good in the museum, they started to be put in the brochures'. While this can be viewed positively, it also points to a rather reductive senior management perception that the role can be publically valued for commercial purposes, evidence of understanding and recognition of the impact of the role, but within internal structures and hierarchies that same value is not forthcoming.

A former Learning manager who had also previously been an Explainer observed:

> Explainers feel that they have all the responsibility of the world on their shoulder, so you know, 'it's my responsibility that they have a good time, it's my responsibility that the show is successful, it's my responsibility that this school gets from here to here', and it's a very minute way of thinking about things (…) it's a really, really narrow minded way to think of things, I'm not saying that patronisingly, and it's not until you move beyond that role that realise, gosh, you've got *no* responsibility [*laughs*] when you look at the bigger picture. And I think that sometimes that needs to be portrayed better. So I know as an Explainer we would always say, 'so what does so and so do in her office all day?' you know, people think you do nothing because you're the one that's out on the floor, you're the one that's working with the public all the time, and I think until that is properly addressed there will always be an issue about pay with Explainers (…) So is there a mismatch between expectations? If you'd asked me when I was an Explainer I'd have said 100% yes definitely, if you ask me now, no. (MGR2/SCM/15)

This view points to the heart of the problem for Explainers – their pay grade, and an apparent connection being made being salary and status. But it also confirms the shift in attitude towards the role at management level, and it is somewhat surprising that a manager who had themselves once been an Explainer has scant empathy with Explainers' concerns. If MGR2/SCM/15 is correct in their assumption that Explainers are always likely to find some aspect of their role to criticise then it suggests that there is certainly a mismatch between *perceptions*, if not expectations. Their observation that an Explainer fails to understand the purpose and work undertaken by someone at a higher level in the same team, a view that I also personally encountered during my former employment as a manager in the Learning team at NMeM, invites the question 'why is this so?' Failure to include Explainers in broader discussions concerning strategic objectives that might illuminate their understanding of the other facets of their teams is one likely reason for their lack of appreciation of those other roles, and consequently, a tendency to sometimes overstate their own contribution. Nevertheless, it is clear that at some of the sites, and at NMeM particularly, lack of understanding about and recognition of their role is for most Explainers, an issue. Practices at NMeM are unusual in that Explainers there are also responsible for developing much of their content and this leads to further emphasis of their dissatisfaction regarding how others perceive them. But it also presents them with opportunities. The observations of some NMeM Explainers indicate a clear recognition of the value of this planning and preparation and the development prospects it offers them:

> In *this* museum the best thing is that we do have a broad range of things to do, we're not just confined to delivering on the floor, we don't just get given a talk and we learn it and that's it, it's not a mechanical role in that regard. We get to develop stuff, and I've had a load of experience here which I don't think most other Explainers get in other jobs. (EXP5/NMeM/14)

> I like the performing and presenting and stuff, that's what I do well, but I do like the other aspects I've never had before in any other job, which is the researching, developing things and actually having input into how things are made and delivered, that's probably quite exciting to me because my other jobs have never had anything like that. (EXP10/NMeM/13)

> I don't think [other staff] always realise ideas come from Explainers *not* the team leader or programmes developer and that a bulk of the research and development of things is done by us. They see us on floor like an audience sees actors on stage, not always realising the work behind the scenes. (EXP7/NMeM/15)

In one sense, this aspect of the role at NMeM puts its Explainers more on a par with the Guide Lecturers, and indeed, the RI scientists, since they too researched and wrote their own material for delivery. While NMeM Explainers appreciate the opportunities this presents to them there is also frustration, for example in EXP7/NMeM/15's comments, and this may in part stem from the fact there is little scope for recognition of their intellectual skills. Of the twelve Explainers who were either interviewed or who responded to the online questionnaire at NMeM all held a Bachelor's degree, four had Masters degrees and two were also qualified teachers. Of the nine ScM respondents to the online questionnaire five held a Bachelor's and two a Masters degree (the highest academic level of the remaining two was A Levels). Managers reveal differing attitudes concerning the relevance and value of a degree for the role:

> Yes [degrees for Explainers] are desirable - a level of previous knowledge to a high level, preferable scientific, a demonstration of aptitude to learn is important. (MGR2/NMeM/14)

> I think an Explainer is a fantastic job for anybody to go into and I think you show amazing skills and you don't need a degree to do it and actually *I* don't have a degree so I was pretty adamant that if I can do it then nobody else

> needed a degree. There was lots and lots of reasons as to why I felt you didn't have to have a degree, I felt it was a very pompous attitude to have in this day and age. (MGR2/SCM/15)
>
> The right person for the job would be the most engaging person, most creative with the ability to write and tell a good story. Grammar was important, but none of those elements require a degree. By requiring a degree, that forces the candidates to come from more academic backgrounds when the most engaging, creative storyteller or workshop leader or actor might not be academic. (MGR1/NMeM/15)

Regardless of these opinions, the Explainers involved in this study almost all held at least one degree, echoing the early 1980s recruitment drives for helpers in the ScM Discovery Rooms when potential staff were identified from amongst the undergraduates in nearby university science departments. Possibly this current position is partly due to the increased access to higher education that has existed in the last thirty years or so but it also suggests that those who have come from a tradition of learning are likely to want to continue to do so and foster that spirit in others.

Those in the job, particularly at ScM, generally recognise the quality of the training they receive and this is one important way in which a valuing of the role occurs that can be seen as helping to offset the low salary. MRG1/SCM/15, who was responsible for introducing many of the training programmes that are currently used for Explainers observed, 'pay is one factor but it's not the most important in motivating the workforce you know. Interesting work, being looked after well and a good team are all things that people value more than that'. Although NMeM Explainers have benefitted from the ScM training programme in the past, this does not happen with any degree of consistency and has not happened during the recent more challenging years. EXP3/NMeM/15 remarked that currently at NMeM 'there simply isn't time to train an Explainer. The museum should hire people that can already do it. The consequences when newly hired people can't perform and aren't team players are huge'. In view of some of their critical positions regarding status and the demands of their jobs, to invest more heavily in developing their skills might be one highly useful way of demonstrating organisational commitment to them and improving work satisfaction levels amongst them.

A further problem is the lack of progression opportunities within Learning teams. As MGR2/SCM/15 noted 'even though they say there is progression for Explainers, there's not progression within that job, you have to move on to do something completely different' but this view is couched in terms that are more positive. They further describe:

> I don't see the Explainer job as a job for life, I think it's something that you get out of it what you can and move on (…) When you look at who the ex-Explainers are and what they *now* are, one's a director, one's an assistant director, you know Head of Learning, the roles that people have gone on to do from being an Explainer I think definitely has something to do in perceptions of it, and I know very much when we do introductions and induction weeks and things, we always go through and go 'this person was an Explainer, they're now this. (MGR2/SCM/15)

While it is correct that some Explainers have certainly progressed to senior roles within the organisation (see 5.5.1) these are far from typical, and considering the large volumes of people who have worked in the role only a small percentage have done so. Explainers themselves are well aware of this and for some it is a de-motivating factor:

> There is no way for our job to progress within this company, there isn't, there's no role there that allows us to progress up, you know, if we go to be an Explainer-developer a) there aren't many of those roles and b) it's just the same as what we're doing now pretty much anyway so, I dunno, I think generally speaking most of us will go elsewhere (…) they'll replace us, d'you know what I mean, we're replaceable… Explainers are easily replaced I think. (EXP5/NMeM/14)

> Whilst the job was incredibly enjoyable for a period of time, the lack of career progression and awful wage means that this is not a job that can be done for any extended length of time. (EXP5/SCM/15)

Investing in Explainer training may well encourage Explainers and elevate their own sense of worth, but a concerning factor might be that given the lack of progression and poor pay, they will simply move on and the training investment wasted. This is a troubling issue for some of the Explainer teams, particularly at the smaller sites.

A concluding observation regarding the diminished perceptions of the Explainer role that other staff may have, is concerned with roots and traditions. Curatorial roles or those involved with collections, typically carry connotations of expertise and erudition and long-held associations with the importance of custodianship and culture. Traditionally too, curators are associated with the production of knowledge and have a responsibility for determining and managing collections. Theirs is a significant role residing near the top of the museum hierarchy and this is in no small part connected to their long-established status. In contrast, the Explainer role is not usually considered to be part of any long-standing heritage or tradition but rather a mid-late twentieth-century construct that has typically placed an emphasis on enhancing visitor satisfaction. The previous chapters of this thesis have sought to challenge such views and suggest instead, that the Explainer role is in fact the latest vital stage in a lineage that extends back as far as the beginning of the nineteenth century, bringing with it important associations of skill, expertise and training. Acceptance of such a position would allow for a re-valuing of the Explainer role and appropriate consideration of its status within the broader museum hierarchy.

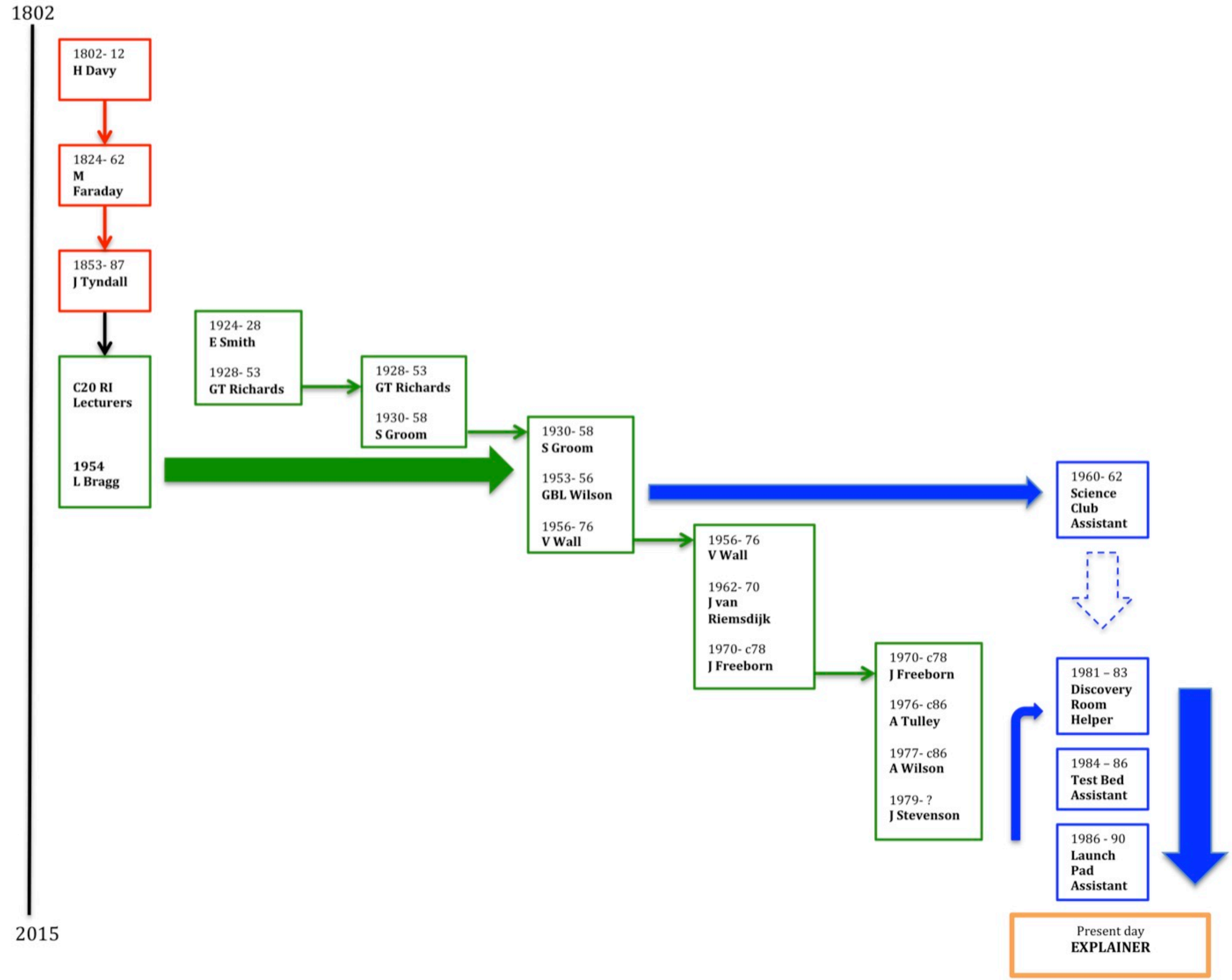
Chapter 6
Conclusions and Recommendations

6. Introduction

Questions of lineage and heritage are at the heart of this thesis. In line with the central research questions the preceding chapters have sought to: establish how and where traces of RI nineteenth-century lecture-demonstration practices can be located in contemporary forms of SMG explaining; and considered how views of both these past and present practices can be enhanced through the lens of performance. This final chapter draws together conclusions structured around the core concerns of the original research questions in the order of priority of importance or relevance as they have emerged through the research, rather than in the order that they have been described throughout the thesis. In addition, and in view of the collaborative relationship with the industrial partner organisation - the SMG/NMeM - it will suggest recommendations for future practice, alongside some possibilities for future research.

6.1 A new Explainer lineage

Through this thesis I have established a new way of understanding the contemporary SMG Explainer role that regards it as the most recent phase in a lineage that can be traced back to nineteenth-century lecture-demonstration practices at the RI. I have argued that this lineage is best understood through the lens of certain Performance Studies and performer-training theories because explaining and lecture-demonstration are essentially performed acts. The Explainer role has not before been considered and theorised in this way. The connected, transgenerational theories of vertical and embodied knowledge transmission, alongside notions of intertheatricality have proved critical to an understanding of the Explainer lineage and have enabled, for the first time, a tangible connection to be made between the performance practices of two major UK cultural organisations: the SMG and the RI. This lineage is represented in the following diagram (*Figure 6.1*):



(*Figure 6.1*) Diagrammatic representation of Explainer lineage from C19 to present day

Such a diagrammatic representation of the Explainer lineage suggests two clear patterns: one diachronic (or vertical) and the other synchronic (horizontal). In the diagram the blocks are colour-coded in order to correspond with the overall chapter structure of the thesis, and these can be seen as representing discrete sections of the overall heritage. Each section also broadly coincides with the periodisation discussed in 1.2.2. Thus, the sections can be understood in the following ways:

- **Red**: Chapter 2 (1802 -1887) represents the vertical, diachronic transmission of lecture-demonstration practices amongst the three core subjects at the RI.
- **Green**: Chapter 3 (1924- c.1980) represents the transmission of lecture-demonstration practices at ScM amongst the Guide Lecturers. In the diagram the diachronic structure is shown through the downward progression of the blocks. These are each linked by a horizontal arrow signifying the constancy of the 'master' role, facilitating the transmission of practices from each pairing of Guide Lecturers to the next. Importantly here, the transmission in 1954 of practices from the RI to ScM is also illustrated by the horizontal bold green arrow representing the physical presence of Groom and Wilson at Bragg's December lecture(s) (see 3.4.2).
- **Blue**: Chapter 4 (1960- 1990) represents the vertical transmission of interactive practices at ScM as early iterations of the present-day Explainer role emerged. As with the previous chapter, there can also be seen an important synchronic transmission, here represented by the blue horizontal arrow, depicting the probable career progression of GBL Wilson from Guide Lecturer to Science Club Assistant (see 4.4). As I suggested in that section, the embodied knowledges transferred through this move appear to have lain dormant at ScM for almost twenty years until a more conducive atmosphere and context of interactivity emerged. Significantly, this was aided through the work of Aubrey Tulley, Anthony Wilson and John Stevenson who oversaw the shift from a traditional lecture service to more experimental interactivity via the Discovery Rooms, and ultimately Launch Pad. In the diagram this move is represented by the bent arrow that

connects these three men to the three iterative roles of Discovery Room Helper, Test Bed, and Launch Pad Assistant.

- **Orange**: Chapter 5 (2000-2015) represents the culmination of the lineage in the contemporary SMG Explainer role.

Significantly, the diagrammatic representation of the lineage in this way reveals a complex pattern of inter-relationships that have not previously been considered. Additionally it facilitates an understanding of the transmission of physical practices as being intentional rather than coincidental. A potential limitation that must be considered resides in the dormant period of 1962-1981 where this research has not been able to establish a direct and tangible link between practices. However, consideration of certain Performance Studies theories alongside this lineage enhances the persuasive argument for the direct passing on of embodied knowledges through the Guide Lecturers. In this way, **a critical lens of performance analysis is fundamental to an understanding of performed explaining in the period 1802-2015**. The consideration of lecture-demonstrations and performed explaining as consciously presented actions, framed within the context of a given space in the presence of onlookers (see 1.5) enables them to be understood as acts of performance. In this thesis I have discussed these performance practices in terms of embodied knowledges that can be vertically, horizontally and intertheatrically transmitted resulting in the restoration of behaviours from the nineteenth century in present day explaining. Thus, it is possible to suggest that the **origins** of the contemporary SMG Explainer role and its performed practices can indeed be located in the nineteenth-century lecture-demonstrations begun by Humphry Davy at the RI.

6.2 Nineteenth-century traces in contemporary practices

One of Michael Faraday's best-known lecture series *On the Chemical History of a Candle* (1849) contained 'experiments that produced bangs, flashes, soap bubbles filled with hydrogen floating roofwards, and other spectacular effects' (Carey 1995: 88). Such a narrative could just as easily be used to describe any of the ScM Explainer-delivered Launch Pad science shows from the late twentieth and early twenty-first century, or indeed, some of those that are increasingly presented at MSI and NMeM. This legacy of exciting, highly visual demonstrations is one of the most important ways in which the **traces** of nineteenth-century practices can be found in all stages of the Explainer lineage as I have conceptualised it. The physical gestures associated with acts of demonstration have endured and been transmitted through the various generations, with each new iteration playing out in a subtly different form (Schechner 2006; Taylor 2003). Inspired by and directly transmitted, in 1954, from those practices in place at the RI, embodied knowledge practices are particularly strong in the current Explainer repertoire at the SMG sites.

(*Figure 6.2*) Enduring embodied knowledge practices within the SMG. The first and second images © *Science Museum/Science & Society Picture Library*

(*Figure 6.2*) illustrates one example where the presentation of a demonstration involving the same scientific principles has been repeated at ScM/SMG for almost fifty years.[110] The top left image shows Mr Wall demonstrating in the lecture theatre at ScM in 1969; the bottom left image depicts an assistant demonstrating in

110 The demonstrations are of the principles of air resistance.

one of the Test Beds at ScM (c.1984-86); the right hand image is of an Explainer demonstrating at MSI in 2014. The similarity in use of presenter gesture in each iteration is evident, and in the 1969 and 2014 moments in particular, the conditions of performance are also remarkably alike.

As discussed (2.2.2), from the earliest days of Davy's lecture-demonstrations it was understood that a broadly entertaining appeal was a significant requirement. As the contemporary form has evolved, alongside the expansion of cultural sites towards 'tourist attraction' (Kirshenblatt-Gimblett: 1998) and associated increased levels of competition, this need for entertainment has intensified. The SMG has responded in more recent years (2010-2015) through the homogenisation of the Explainer role (see 5.5) to create a performance product that can be consistently recognised across all the sites, and that offers audiences enjoyable, engaging, pacey and interactive performed experiences. As with the nineteenth-century models, as well as those of the mid-twentieth-century Guide Lecturers, Explainers today present entertaining science shows that recreate and re-stage demonstrations and experiments with the artifice that it is happening as if for the first time. In such a way, audience enjoyment is heightened as they participate in the fiction that an unknown outcome might occur as a result of the demonstration. One significant difference between these contemporary practices and their predecessors can be found in the use of audience volunteers, audience participation and increasingly diminished levels of formality. Chapter 4 (4.6.2) explored the gradual shift from the 'unobtrusive' presence of the helper role in the Discovery Rooms to the highly visible, active presence of the contemporary Explainer, and this can be partly attributed to the shift in function of the museum and subsequently more complex audience tastes and expectations. The SMG's investment in audience advocacy and research has contributed to the understanding of these concerns.

A further location of similarities between, or **traces** of nineteenth-century practices in contemporary ones is found in the area of training and preparation for performance. These were particularly explored in Chapters 2 (2.5) and 5 (5.5.1) but have also been considered more broadly throughout the thesis. I have discussed how in the contemporary system the training of SMG Explainers at all sites occurs through a system of peer-supported mechanisms and these can be understood as having parity with nineteenth-century practices in several ways. Currently peer-led training and peer observation-feedback comprises a significant part of the SMG package and recalls the actions of the nineteenth-century RI assistants holding up the 'time' card to ensure pace in delivery, or Faraday and Magrath's practices of practical peer review at the City Philosophical Society (see 2.5). Most significantly, these peer-led practices have contributed to the enduring vertical transmission of performance practices, ensuring that the aspects of the repertoire of lecture-demonstration have left their trace through the generations.

As with Faraday's mid-nineteenth-century approach the SMG's current strategy, particularly evident at ScM and MSI, is to facilitate a training that broadly addresses both bodily and vocal demands (see 5.5.1). Such a preoccupation chimes with Faraday's understanding of the need for physical action in performance and how audience engagement can be achieved through simple communication techniques (see 2.5). The current SMG vocal training programme ('PAMPERS' see 5.5.1) emphasises elements that closely resemble core elements of Benjamin Smart's 1819 elocution instruction - including pronunciation, articulation, modulation and repetition - that was so admired and practised by Faraday. Smart's focus on the equal importance of physical gesture (see 2.5) alongside vocal technique as part of the training for a natural and engaging presenter also pre-empts the current SMG approach. **Traces** then indeed, of nineteenth-century performance training traditions re-emerging in contemporary practices.

Differences between the approaches also inevitably emerge and these are perceived in terms of the frequency and intensity of the training or instruction. Smart's vast numbers of incremental exercises were designed for practice in weekly lessons with the expectation that they should never cease - his was an attitude of a lifelong approach to learning. The current system for ScM and MSI Explainers provides presentation skills training as one element of a weeklong induction that also includes a variety of other facets connected to understanding the role and the site. Once completed, there are some limited opportunities for individuals who are identified as exceptionally capable to undertake *Advanced Presentation Training*, but for most, on-going training is not available and any future development work is confined to peer-observations and the peer-led teaching of new presentations. As discussed in 5.5.1, such practices contribute significantly to the transmission of performance behaviours amongst each cohort of Explainers, recalling the traditions of vertical transmission amongst the nineteenth-century RI scientists (see 2.3.1). Arguably, the contemporary picture reveals diminishing attitudes to the status of the Explainer; the commitment to providing professional skills training and development only extends so far, and SMG senior management do not consider it enough of a priority to find space within Explainer working schedules to expand it further.

In essence then, **traces of performance behaviours from nineteenth-century lecture-demonstrations** can be said to reside particularly in the performance practices and behaviours evident in contemporary SMG science shows, notably through the ways in which Explainers present practical demonstrations. Additionally, they can be found in certain of the Explainer training methods: those associated with vocal and physical expression, and those focussing on peer-to-peer approaches of vertical transmission.

6.3 Shifting attitudes: status, value and expertise

This research has found that responses to my subsidiary questions 2 (**shifting attitudes**) and 3 (**expertise, value and status**) are interlinked. One of the most significant shifts through the period can be seen in perceptions of the role at ScM as its status has gradually diminished from the title 'Guide Lecturer' to 'helper' or 'assistant', and finally, in a move that implies slightly more autonomy, to 'Explainer'. In all these iterations the role is defined and described by its core action or activity. The noun 'Lecturer' carries with it connotations of expertise, knowledge and academic prowess, although as I explored in Chapter 3 (3.3.1) early appointments to the role at ScM were made largely on condition of ex-military status and it was not until 1930, with the arrival of Sidney Groom, that proven experience in the field of education was seen. In 3.2.2 I explored how the Guide Lecturers occupied an unusual place in the overall ScM hierarchy, particularly from 1930-mid-1950s when the lecture-demonstrations for schools were introduced. Their role was characterised by an unusual combination that valued knowledge and expertise but was marked by a relatively indefinable rank (see the discussion of their placing on the 'Senior Staff' list but photographed in 1933 with warehouse packers and catalogue stall staff). I have suggested that in part, this difficulty of definition stemmed from the fact that throughout most of the role's existence only two individuals were employed at any one time, and the Museum was, throughout this period, only beginning to discover how it wanted to engage its publics through live-person interpretation and education. As with the contemporary Explainer role, however, their capacity to influence the experience of an individual's encounter with the Museum and its themes and objects, was significant. This incongruity between status and impact endures, and as I discussed throughout Chapter 5, and particularly in (5.6), despite the importance of the role in terms of its public impact, it remains relatively low in the overall Museum hierarchy, with many 'back-of-house' roles taking a view that it is less skilled, professional and ultimately significant than their own.

This thesis fundamentally challenges that assumption by revaluing the contemporary role through: a) its inclusion as the current and important element in a long-established and well-regarded tradition that extends back to the nineteenth-century lecture-demonstration practices of significant 'men of science' (see *Figure 6.1*); and b) analysis and presentation of the role as a complex hybridisation of multiple performance registers (5.4.2). The second objective here elevates the role beyond the functions of customer service and Learning and suggests that it requires significant levels of performance and communication skill that are more demanding and multifaceted than any of its ScM predecessors. That Explainers have typically been well educated (see 5.6) highlights the enduring focus on core subject knowledge as an intrinsic element of the role, but as performed explaining practices take on increasingly creatively-charged elements through the format of the science shows, the type of person best-suited to the work will need to be equally proficient in complex performance skill. Recognition of such skill may be difficult to achieve in the current culture of the SMG (see

Recommendations 1 and 2). In June 2016 the NMeM advertised for two Explainers. Summarising the role, the advert contained the following text:

> What is an Explainer? If you are a confident speaker, enjoy working with people and have plenty of enthusiasm about making science interesting you could be an Explainer at the National Media Museum.
>
> (Science Museum Group: 2016)

This description, although perhaps necessarily simplified for the purposes of attracting a large pool of applicants, does not acknowledge the complexity of the role as articulated in this thesis and crucially, continues to locate it only within the sphere of customer service and education. Additionally, conceptualising the role as being inherently and predominantly concerned with 'confident speaking' suggests a simplification and under-valuing of its heritage and intricacy. Such categorisation also contributes to reinforcing the acceptability of the existing low levels of Explainer pay.

Shifting attitudes towards **status** and **expertise** are also apparent in comparisons between the contemporary role and its nineteenth-century origins. Davy, Faraday and Tyndall all commanded the respect and admiration of vast audiences from the elite classes spanning nineteenth-century genteel London society, and to different degrees all three came to epitomise the RI, each holding a privileged position in the scientific cultural hierarchies of the of the time. As noted (2.1.1), they are arguably best remembered, particularly Davy and Faraday, for their many discoveries and contributions to the advancement of science and they were genuine pioneers in their fields. This element of their work that focuses on them as scientists rather than lecturers, and is consistent with both Morus (1998) and Golinski's (1992) articulation of their private (laboratory) versus public (lecture theatre) roles, accentuates their value as contributors to paradigm-shifting scientific thinking and highlights the notable difference in their statuses from the twenty-first-century role. The RI scientists were responsible for devising and conducting the experiments that led to the discoveries and inventions that gave them their renown, as well as for disseminating their knowledge and findings via the lecture-demonstration. Indeed, one element of their specific presence was doubtless connected to the fact that they held a kind of celebrity status and there was a certain thrill for the audience associated with seeing and hearing the actual men who had made the discoveries at first hand (Taylor 1988: 3; Caroe 1985: 129). They needed to be accomplished both as scientists and as communicators, Davy and Faraday in particular having 'unchallenged reputations as superb lecturers' (Forgan 2002: 19). Contemporary Explainers need to be expert presenters and demonstrate an excellent understanding of scientific, particularly in ScM itself and MSI, and increasingly at NMeM, but there is no requirement for them to actively investigate and experiment. In this, there is a fundamental difference between the status and perception of the two roles.

6.4 SMG: cultural and historical views

Less prominent in the outcomes of this research have been findings of real significance relating to furthering understanding of the **cultural and historical development of ScM and SMG**. Focussing on the Explainer role and its antecedents has revealed that the place of women within such roles has only relatively recently – since the 1980s – become commonplace. This can be contrasted with present day moves to foreground their participation in broader scientific activity. A current campaign entitled *Your Life* aims to boost young people's, and particularly girls', participation in and study of STEM subjects by 50% in the period May 2104- May 2017. Significantly ScM was chosen as the host venue for the launch demonstrating its own alignment with valuing the place of women and girls in the science industries. Announcing the campaign in ScM's Making the Modern World gallery, then Chancellor George Osborne observed that 'when you see all the incredible exhibits here (…) it is easy to think this happened in Britain's past…that is not true. One of the key things we are trying to challenge in this campaign is the idea that science engineering and design are all part of Britain's great industrial past, not our future' (Stanley: 2014). The sentiments behind Osborne's message, the *Your Life* campaign and thematically expressed in the Making the Modern World gallery reveal an ongoing commitment on the part of the Museum to playing a broader cultural role in inspiring future scientists – a mission that in common with that of the RI, it has held, in variously worded guises, since its inception. The new focus on STEM at NMeM (see 5.2.2) brings that museum into line with the overarching SMG Learning strategy for developing science capital (5.3) and as has been discussed, fundamentally involves Explainers in its delivery. The inclusion of the role in such crucial plans is one example of the important impact they can potentially have.

Using the Explainer role and its antecedents as a lens through which to consider ScM/SMG cultural practices reveals something of the shifts in methods of audience engagement. Explored most fully in Chapter 4, I have discussed how practices have developed from the largely didactic methods of the Guide Lecturers to the more inclusive and interactive practices of contemporary Explainers. I have suggested that these have broadly followed trends in science communication, and perhaps more crucially, audience tastes and expectations, revealing the SMG to be striving to be perceived of as at the foreground of progress.

A further, connected, aspect of the cultural development of the SMG highlighted through analysis of the Explainer role can be revealed through comprison with Andrea Witcomb's introduction to *Re-imagining the Museum* (2003) in which she documents a very public dispute in 2001 between the directors of two prominent Australian museums.[111] Essentially at stake were the reputations of the museums in terms of how their cultural roles and methods of engagement were understood by the public. One director reflected critically on the emergence of the '"super-museum" – marked by the use of multimedia and other populist strategies for attracting new audiences' (Witcomb 2003: 1) that he regarded as being at odds with valuing research and artefacts, an opposite model to the kind of museum with which he himself was associated. In response, the other director referred to 'old-style museum[s]' (Witcomb 2003:1) and suggested that although there was plenty of room for diversity in museum practice, 'contemporary audiences are fairly sophisticated media consumers' (Witcomb 2003: 2) and would be more likely to feel engaged with museum approaches that reflected this. In essence she implied that her counterpart was out of touch with the complexities of contemporary audience needs. This debate, although a little reductive, highlights the tensions that exist for museums in the twenty-first century as they negotiate their identities

[111] The debate was staged in *The Australian* newspaper between Tim Flannery of the Museum of South Australia and Dawn Casey of the National Museum of Australia.

as somewhere between the poles of 'traditionalists and renovators, objects and multimedia, objects and ideas, education and edutainment' (Witcomb 2003: 2). The SMG, while taking great care in recent years to be seen to be valuing research and to be engaging with more traditional academic purposes, has also undoubtedly embraced the role that tourism and entertainment can play in helping it to achieve its ambitions to 'deliver high-impact and inclusive programmes for increasingly diverse audiences'.[112] The techniques and forms of performance that it increasingly adopts across its sites through its Explainer-led work can be regarded as one essential element of this strategy. Whether or not the SMG sees itself as a group of 'super museums' there can be little mistaking its attempts to attract and retain audiences through populist and familiar methods of performance. In such a way, the SMG can be seen as being wholly responsive to the cultural and societal shifts that place audience experience at the heart of an encounter and that values their contribution and participation. Explainers are crucial to this shift since they are the ones who construct and orchestrate such encounters, taking audiences with them, responding spontaneously to their needs and ensuring that positive, life-enhancing experiences are achieved. As such, the Explainer role should be regarded as fundamentally important to the enduring success - reputationally and experientially - of each of the museums in the SMG.

6.5 Recommendations and suggestions for further research

In order to reflect the industrial collaborative nature of this research investigation I conclude with some recommendations for the consideration of the partner organisation (NMeM/SMG) in the first instance, but also with the aim that certain of them may prompt further, broad discussion and reflection within the science museum and science centre industry. Given the nature of this research and its specific focus on the Explainer performance practices of the SMG it is inevitable that certain of these recommendations will only be of relevance to that organisation, but where there is scope for wider impact, which would necessarily

[112] This is the first of six core strategic ambitions laid out in the *ScM Strategic Ambitions 2012-22* document (p.12). The others relate to science themes, approach, digital strategy and acquisition, partnerships and collaborations, and research and innovation.

require further research, I have indicated this in the recommendations below. In the light of the findings of this thesis, I recommend that:

1. Across the SMG recognition is given to the historical antecedents of the Explainer role, and it is understood as the most recent iteration in the development of a broader lineage of performed science communication roles that can be traced back to nineteenth-century lecture-demonstration practices at the RI. This is intended to inspire an institutional commitment to acknowledging the long-standing traditions associated with the role as identified in this thesis in order to contribute to a re-valuing of its status within the broader museum hierarchy. Recognition of the role as part of an established science communication tradition with roots that can be connected to the practices of an elite scientific teaching organisation (the RI), as well as to important and early educational practices within its own organisation (Guide Lecturers), could serve to elevate certain extant perceptions of the role beyond customer service and audience entertainment. Countering negative or dismissive perceptions of the role in this way may, in turn, leads to greater respect for its important and fundamental contribution to SMG mission principles of audience engagement, satisfaction, learning and inspiration, placing the role at the heart of what its museums actually do.

Although this recommendation is specifically concerned with perceptions of the Explainer role within the SMG, it is possible that greater recognition of this role within such an important national scientific institution could lead to a re-valuing of similar roles in other science museums and science centres.

2. **The complexity of the performance registers used by the contemporary SMG Explainer role is duly recognised by those with responsibility for their training and management.** In addition to bringing the benefits identified in Recommendation 1, greater understanding and acknowledgement of hybridity in the Explainer role would enable the specifically targeted training of Explainers that appropriately privileges performer training techniques. For the industry partner, this may result in improved quality in individual Explainer performance as well as

the overall product (e.g. science show, storytelling session). Consequently, this may contribute to reputational success and increased audience figures consistent with the SMG mission to be 'internationally recognised for [its] creative exploration' of science and industry. As a further potential consequence of improved training, Explainer satisfaction and thus commitment to, and longevity in role may increase.

As with Recommendation 1, although specifically aimed at the SMG, many of the 60+ UK member organisations of the Association of Science and Discovery Centres (ASDC: 2015) use similar, variously titled roles with the same requirement for demonstration and performance. Recognition of performance complexity and the multiple registers used within these roles, and the subsequent use of appropriate targeted performer training techniques may result in similar benefits for these organisations.

3**. Training of Explainers is approached with consistency across all SMG sites involved in this research**. There is currently, and historically, a disparity in the approach that has largely ignored the needs of Explainers at NMeM. With the described homogenisation of the role in terms of performed outputs (5.5), so too should there be equality of approaches to training. This could greatly enhance the perceptions of the Explainers at that site in terms of how they are valued by the organisation, and may also incorporate the benefits identified in Recommendation 2.

This recommendation is specifically for the consideration of the SMG and is aimed at ensuring parity with the treatment of Explainers across all its museums.

4. Explainer training mechanisms and methods should be adapted to overtly include performer-training techniques that cultivate presence. Recognition amongst those with a responsibility for managing and training Explainers that the immediacy of the live moment of performance offers opportunities to capitalise on the interplay between performer and audience may result in heightened skills of delivery, leading to a heightened experience for the spectator. Acknowledgement in the field of Performance Studies that presence can be nurtured through training supports this notion. An approach that places greater focus on identification of the desired or intended effect on the audience may lead to improved understanding of the ways in which Explainers can be trained to deliver it, ultimately contributing more effectively to the SMG's overarching strategy of LEE (5.3.1).

As with Recommendations 1 and 2, this proposal could have a positive impact on, for example, ASDC member organisations where performance modes form significant elements of their public engagement offer. Within the broader industry, cultivating individual performer presence in those organisations for whom live interpretation plays an important role (for example heritage museums, historic buildings, living history sites) may also bring benefits for them in terms of their ability to pinpoint intended or desired effects on audiences, and greater understanding of how they may be able to achieve this. The same benefits of improved connection between spectator and performer that may be useful to the museums in the SMG, are then, likely to be useful to a wide range of similar and related organisations where performance plays a key role in audience engagement.

5. The use of the term 'performed explaining' is adopted within the SMG to describe the performance-centred work of the Explainer. The identification of this aspect of their role as something specific and separate to that more usually described in the heritage sector as 'live interpretation', presents further opportunities for greater recognition of the value and status of the role: it does something other than simply 'explain'. Making a clear distinction between the performance elements of the Explainer work and the other, more facilitative aspects of the role – leading workshops, organising and delivering practical 'make and take' sessions, for example – may also further assist managers when considering training needs and planning workload and preparation or rehearsal time for Explainers.

Use of this term more broadly within the industry and ISTCs may serve to categorise more specifically what is done in these contexts, resulting in greater clarification and understanding of the role and its capacities, and enabling appropriate differentiation between science and heritage public engagement to be made.

7. Further research possibilities may be located in certain live-person interpretation practices at ScM during three periods explored in this thesis: 1924-58 – specifically the early practices of the Guide Lecturers; 1960-80 – the Science Club and possible connections with the Lecture Service; 1980-86 – the Discovery Rooms and Test Beds. My research into the period from when the Guide Lecturer role was first introduced (1924) to the time around the retirement of Mr Groom (1958) did not yield many detailed results. Further research may contribute to a better understanding of their early practices and enhance views of their work as performance. This research has acknowledged that a potential weakness in the proposed lineage exists during the period 1960-80 (represented by the broken-line arrow in the diagram *Figure 6.1*). Further research is needed to extend understanding of events in this period and to scope the possibility of the continuation of the Science Club after 1962, any potential connections between that activity and the Lecture Service, and further evidence of the role and impact of Mr GBL Wilson on these aspects. Such research may contribute to strengthening the lineage around this time and enhancing knowledge and understanding of the impact of person-led interpretation at ScM during this period. Finally, my research did not uncover any significant detail relating to the work of the Discovery Room and Test Bed Assistants in the period 1980-86. Further research may identify more specifically what was done by these roles and how much of a part performance modes may have played. Again, not only would this contribute to strengthening the proposed Explainer lineage, but would also augment knowledge of important public engagement practices during a vital period of change in ScM's history as it moved towards interactivity and participation.

8. The recognition that Performance Studies and performer training disciplines offer significant new opportunities for future explorations into the presentational roles extant in other science and natural history museums and ISTCs. In view of the ubiquity of the Explainer-type role across cognate institutions such as ISTCs and Discovery Centres, it is likely that extending the paradigm of research adopted in this thesis to include other such roles would benefit a performance-focussed understanding of them. This in turn, may eventually contribute to enhanced industry-wide valuing and perceptions of this type of role and its function. Whilst the fields of Theatre and Performance Studies have been richly exploited in order to augment thinking and theorising about the heritage industry, this has yet to happen with any significance in the science museum and science centre sector. This research has demonstrated for the first time how the application of certain theoretical constructs from the field of Performance Studies and the framework of certain notions of performer training leads to a deeper understanding of the complexities of the public-facing role of the SMG Explainer and its antecedents, and an augmented view of historical and current public engagement practices in that organisation. It is hoped that this research may be the just starting point for the further, and broader adoption of performance theory as a way of understanding and developing science museum and science centre public engagement activity.

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Appendix
Record of Interviews and Explainer Observations

Key
FF – Face-to-face
UI – Unstructured interview
SSI – Semi-structured interview
T- Telephone
OB – Observation of Explainer performance

Date	Activity	Role/Site
6.11.12	FF UI	Former Director of *Action Replay*
8.1.13	OB	NMeM (NSSH – Training)
9.1.13	FF UI	Explainer ScM
9.1.13	FF UI	Explainer TL ScM
9.1.13	OB	NMeM (NSSH – Training)
26.2.13	FF SSI	Explainer Manager NMeM
26.2.13	FF SSI	Explainer NMeM
26.2.13	FF SSI	Explainer NMeM
26.2.13	FF SSI	Explainer NMeM
26.2.13	FF SSI	Explainer NMeM
6.3.13	FF SSI	Explainer TL NRM
28.8.13	OB	NMeM (NSSH x2)
16.10.13	OB	NMeM (Real to Real; Exp TV)
29.10.13	OB	NMeM (Real to Reel x2)
5.12.13	OB	NMeM (Exp TV x2)
19.12.13	OB	NMeM (Family activities)
16.1.14	OB	NMeM (NSSH x2)
22.1.14	OB	NMeM (Cottingley Fairies x2; NSSH)
4.2.14	FF SSI	Explainer NMeM
4.2.14	FF SSI	Explainer NMeM
4.2.14	FF SSI	Explainer NMeM
9.4.14	OB	NMeM (Real to Reel)
29.7.14	FF UI	Head of Learning NMeM
29.7.14	OB	NMeM (NSSH x2; LCA x2)
1.8.14	FF SSI	Learning Manager MSI
1.8.14	FF SSI	Explainer TL MSI
1.8.14	FF SSI	Explainer TL MSI
1.8.14	OB	MSI (Rev MCR; Inventors Wanted; Engineer Eric)
4.11.14	FF UI	Senior Curator ScM
4.11.14	FF UI	Head of Research ScM; ex-Museum Assistant

4.3.15	FF SSI	Ex-Explainer ScM/ Explainer trainer/ Head of Learning NRM & NMeM
9.4.15	T SSI	Ex-Manager of LP/Interactive Galleries at ScM
23.4.15	OB	NMeM (LCA x2)
8.10.15	Q	Ex-Head of Learning NMeM
8.10.15	Q	Ex-Explainer NMeM
2.12.15	OB	NMeM (LCA x2)

As noted in the Research Methodology (1.2.1) observations of Explainer performances and training at the ScM were conducted over 5 days in July 2010 and 3 days in October 2011 whilst I was still employed by the NMeM.

Online questionnaire periods

Role	**Opened**	**Closed**	**Responses**
ScM Explainer	21.4.15	21.5.15	9
NMeM Explainer	17.6.15	1.12.15	6
NMeM Learning Manager	17.6.15	30.9.15	1