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## Introduction

### Oliver Lodge: Continuity and Communication

James Mussell and Graeme Gooday

It may be felt in any single page of Forbes's writing, or De Saussure's [or Tyndall's either], that they love crag and glacier for their own sake's sake; that they question their secrets in reverent and solemn thirst: not at all that they may communicate them at breakfast to the readers of the *Daily News* – and that, although there were no news, no institutions, no leading articles, no medals, no money, and no mob in the world, these men would still labour, and be glad, though all their knowledge was to rest with them at last in the silence of the snows, or only to be taught to peasant children sitting in the shade of the pines.<sup>1</sup>

Oliver Lodge quotes these words by the English art critic and intellectual John Ruskin in the penultimate chapter of his memoir *Past Years* (1931). Titled 'Scientific Retrospect', this chapter is a reprinted version of a talk Lodge delivered at the fiftieth anniversary of the Physical and Chemical Society at University College London (UCL) in 1926. After reviewing the progress of science since the Society's foundation in 1876, Lodge promoted a model of natural science as a disinterested enterprise carried out for its own sake rather than for personal gain. This view of science as a 'pure' intellectual study drew upon a tradition

deriving from Ruskin's position in a major geological controversy nearly a century before the publication of *Past Years* and involved Lodge's early inspiration for physics, John Tyndall.

The Ruskin text quoted by Lodge originated in an extract from *Fors Clavigera* (1871-84) later appended to a translation of Rendu's *Theory of the Glaciers of Savoy* edited by Edward Forbes and published in 1874.<sup>2</sup> Forbes had published the translation in response to renewed allegations of plagiarism made against his father by John Tyndall in his *Forms of Water* (1872) and he included the extract from Ruskin as part of his defence of his father's position as a disinterested participant. As the original dispute over the movement of glaciers had erupted in 1857, it was already sixteen years old when Ruskin addressed it in *Fors Clavigera* and seventy four years old by the publication of *Past Years*.<sup>3</sup> Looking back at the end of his life, Lodge returned to the Victorian context of his youth, setting out a version of unworldly scientific practice that contrasted markedly with the account of his career he described elsewhere in the book.

Delivered in a speech to students on the anniversary of a scientific society, such sentiments were not unusual; however, coming at the end of a volume that documented Lodge's long career, they are not so straightforward to explain. Lodge might have espoused scientific research for its own ends in *Past Years*, but he was deeply interested in applying science to real-world problems, starting companies and holding patents, as well carrying out a range of consultancy and other advisory work. And he was no solitary researcher: while Lodge seemed to approve Ruskin's celebration of the individual scientist, he nevertheless recognized that his own career had been shaped by those around him. In *Past Years* he acknowledges many of those with whom he collaborated as well the contributions of some of his assistants; the book also makes clear how science was entangled with family life and celebrates the many friendships that sprung from his scientific work.

In 1931 Lodge was one of the most famous scientists of his day, yet he was best known for work carried out many years before. As he himself admitted in the 'Preface' to *Past Years*, his scientific career had reached 'a sort of climax' in the 1890s.<sup>4</sup> In 1898 Lodge's work was acknowledged by the Royal Society, who awarded him the Rumford Medal, and in 1902 he was knighted. Nevertheless, thirty years later Lodge remained a respected scientific authority, able to find substantial audiences in print and person. His career had begun in London in the 1870s and he had grown up with figures like Forbes, Tyndall and Ruskin. For many of those who heard him speak or read his words, it was this link to what seemed a prior age that made Lodge a reassuring figure of continuity with Britain's Victorian heyday. He had not only witnessed the rise of Darwinism, the advances in electromagnetism, and the wonders of radioactivity, but had rubbed shoulders with key figures, written about and discussed their innovations, and, in many cases, played a direct part himself. While Lodge might have appeared to condone Ruskin's attack on those who communicated science 'to the readers of the *Daily News*', Lodge had written for the public from the very beginning, producing books and pamphlets as well as articles for both commercial and academic presses. Indeed, he understood such work to be part of a scientific career and, as his career progressed, so did the nature of the invitations. Lodge not only explained the latest scientific advances to his audiences, but increasingly speculated as to their significance too.

Lodge was considered to be a spokesperson for science, but as the contents of *Past Years* makes clear, Lodge worked in a number of fields that were to him interconnected. Just as there are three chapters about his days at Liverpool, those heady days between 1881 and 1900 when he had most of his scientific success, so there are three chapters that detail his psychical research. Lodge had become interested in spiritualism in Liverpool in 1883, joined the Society for Psychical Research (SPR) the following year, and served as its president from 1901-3. Lodge's interests were initially in thought transference but by 1889 he had become

privately convinced that the mind could survive the death of the body.<sup>5</sup> While always cautious about the way he presented his spiritualist views, he was not afraid to defend them, even declaring his belief in survival in his Presidential Address to the British Association for the Advancement of Science in 1913.<sup>6</sup> Lodge's scientific work focused on the ether, the imponderable, perfect medium necessary to account for electromagnetic radiation, and this elusive substance provided a ready explanation for what would otherwise be occult phenomena. Poised between matter and metaphor, the ether became central to Lodge's broader philosophy: not just the medium of electromagnetic radiation or spirit, it became the point at which the two met. In person and in print Lodge was always reasonable yet never afraid to address areas of controversy. Not only did his work explain the latest scientific advances as well as the claims of spiritualism, it offered to reconcile both within a recognisable Christian framework.

The way Lodge presented his career in *Past Years* underscored continuity, whether over time, bridging the gap between the Victorian period and the generations that followed, or between those rival and contested bodies of knowledge that would account for the workings of the universe. Lodge was someone with whom his readers had grown up and his very appearance corresponded with how they thought an eminent scientist should look. While there were scientists, especially fellow physicists, who found Lodge's engagement with spiritualism objectionable, and spiritualists who thought he remained too sceptical, for many others Lodge's position offered a comfortable middle ground, open to new ideas while engaging seriously with the evidence. Yet while Lodge's ideas had appeal, his authority rested on the way those ideas were communicated. Throughout his career, Lodge addressed an audience beyond that of his immediate peers. As he became more eminent – as a scientist, as a spiritualist, as the head of an important civic university – he was able to address larger subjects and, at the same time, could command more cultural authority.

It is between these two poles, continuity and communication, that we present Oliver Lodge in this volume. Through ‘continuity’, the book explores Lodge’s long career as well as how it challenges the way we divide and make sense of the period. Under this head, our contributors examine Lodge’s participation in the various fields, scientific and otherwise, in which he was active, as well as how this activity was interconnected. Focusing on ‘communication’ opens up Lodge’s practice as a researcher, teacher, and populariser, as well as how cultural authority was linked to celebrity. Our contributors look at Lodge’s work in communications, whether his pioneering research in wireless telegraphy or his experiments with thought transference, as well as how Lodge presented himself in person and print. Together, both themes provide the means to understand the neglect of Lodge in scholarship from the mid twentieth century onwards. In the decades after his death, Lodge became seen as an anachronism: rather than a reassuring figure from the past, he was a Victorian who lived too long; his opposition to developments such as relativity and quantum mechanics and his staunch defence of the ether associated him with a bygone age; his enthusiastic embrace of spiritualism marred his scientific legacy; and finally, because Lodge’s reputation was as much due to the way he popularised science as his original research, significant aspects of his career appeared subsidiary in a history of science that acknowledged only innovation and discovery. This book argues that the reverse is true: that Lodge’s long career offers the opportunity to reflect on both historical periodization and the construction of legacy, that the way he worked across fields exposes the historicity of disciplinary knowledge, and that the communication of scientific ideas is part of their history.

## **Oliver Lodge**

Much scholarly research on Oliver Lodge has focused on just a few aspects of his broad-ranging career. Typically these explore connections between two parts of life and work, for example his ether physics and his spiritualism;<sup>7</sup> his applied physics and his commercial patenting;<sup>8</sup> or his spiritualism and cultural authority.<sup>9</sup> The binary focus of such research undoubtedly brings simplifying clarity and explanatory power, yet the necessary restriction makes it difficult to view the many (more-or-less) interconnected strands that quickly become apparent when we take a broader view of his life and career. More than that, such accounts cannot tell us why Lodge was such an extraordinarily well-known and respected authority in British culture and beyond. Instead, they tend to leave the impression of Lodge as a somewhat eccentric, cranky or inconsistent individual with an unmanageably broad array of interests, largely a bit-part player in other people's stories of science and its popularisation.

Even Lodge himself in *Past Years* could only manage the telling of his own life by compartmentalising his accounts into discrete chronological or thematic chapters. In so doing he said very little about some major areas of his life, notably his popular writing, journalism, commercial consultancy, patenting activity, radio broadcasting and municipal socialism. These features were, after all, not part of the preferred public identity of the professional physicist, who, after the First World War, tended to present him or herself on the basis of expertise and 'pure' knowledge rather than Victorian commitments to public service and useful science.<sup>10</sup> Lodge was more gifted than other physicists in his capacity to cultivate relationships across different social strata but, while he acknowledged some of those who influenced him, others are missing entirely or have their roles underplayed. So, while Lodge's debts to the spiritualist Frederic Myers are given more than a cursory treatment in the spiritualist sections of *Past Years* and occasional references made to the inspiring popular lectures of Irish physicist John Tyndall, much less is made of the enormous influence upon him of Alexander Muirhead, his collaborator in the telegraph industry, and, during his

Birmingham days, the politician Joseph Chamberlain.<sup>11</sup> Throughout, Lodge presents his life as a series of loosely integrated accounts of his physics, spiritualism, and family life and himself as a self-effacing individual, proud of what he has achieved but aware that he might have done more. Yet there are passages where this performative modesty is dropped in an attempt to reclaim credit, most notably against the better-known claims of Guglielmo Marconi for the invention of wireless.<sup>12</sup>

How then can we capture Lodge's episodic yet by no means fragmented life in a single chronological structure? Simplifying the narrative of *Past Years*, one possibility is to follow the four stage career pattern outlined in W.P. Jolly's 1974 biography *Sir Oliver Lodge*: education and early life (1851-1880); the Professorship of Physics and Mathematics at University College Liverpool (1881-1899); the Principalship of Birmingham University until its end just after the First World War (1900-1919), and then his active retirement between two world wars (1919-1940).<sup>13</sup>

To start with the early years, Lodge grew up in the Potteries district of Staffordshire. After a classical grammar school education memorable only for its vicious corporal punishments, followed by two years as a private pupil, Lodge left school at fourteen to join his father's clay business. His passion, however, was for experimental science and before long he sought to escape the drudgery of pottery sales. Inspired by lectures in London, particularly by Tyndall at the Royal Institution, he began to study at local institutions – the Stoke Athenaeum, the Wedgwood Institute at Burslem, and the Potteries Mechanic's Institute – and carrying out experiments at home. After a more rigorous training in chemistry and physics at the Science Schools in South Kensington 1872-3, Lodge returned to London in 1874 and began to work with George Carey Foster at University College, London. Having shown a strong aptitude both for writing and lecturing in popular and academic forms of

physics, he secured the first chair in that subject at Liverpool's recently opened University College in 1881.

There at Northwest England's Atlantic port city, Lodge developed an interpretive approach to Maxwellian ether physics that earned him the respect of mathematicians as well as the broader public; however, alongside his growing fame, Lodge also deployed his Maxwellian wisdom in commercial projects for lightning conductors and telegraph cables. In *Past Years*, Lodge traces the origins of his interest in lightning conductors to the Mann lectures delivered at the London-based Society of Arts in 1888 and frames this work in Maxwellian terms. Rather than understand lightning as a direct current, the received view (and one supported by William Preece, the Chief Engineer at the Post Office, amongst others), Lodge maintained that it was better understood as a rapidly oscillating electrical discharge and so self-induction (electromagnetic inertia) was more important than resistance in the design of conductors.<sup>14</sup> However, what Lodge did not mention in *Past Years* was the patenting he enacted to profit from this aspect of his Maxwellian expertise. Central to this was his long-distance collaboration with the London-based telegraph manufacturer Alexander Muirhead, which is entirely omitted from *Past Years*. This partnership began in April 1887, first working on lightning protection apparatus, then on submarine telegraph cables, then the Lodge-Muirhead wireless telegraphy syndicate until it was wound-up in 1911. In a very extensive correspondence of hundreds of letters, we can see that it was to Muirhead that Lodge turned for commercial and patent advice in electro-technical enterprise, expertise that Lodge, busy working within the university while pursuing psychical research, had little time to develop.<sup>15</sup>

Prior to his awkward encounters with Marconi and his wireless patents, Lodge's intermittent recourse to patenting in the late 1880s and early 1890s related to power supply and submarine telegraphy. However, while recognizing the role patents played in the

commercial development of technology, Lodge was more interested in sharing his knowledge about electricity through lectures and textbooks. It was in this context that he first presented his research into Hertzian waves and the means of generating and detecting them. Heinrich Hertz died on the 1 January 1894 and, as the leading public speaker on the relationship between Maxwellian topics and Hertz's experimental work, Lodge was the natural choice to give the memorial lecture at London's Royal Institution in June 1894. Lodge published the lecture as *The Work of Hertz and Some of His Successors* later that year; however, stunned by Marconi's patent for a means of wireless telegraphy (and one that used an improved version of his apparatus) in 1897, he revised the title of the second edition to *Signalling across Space Without Wires* (1898). With this more Marconian title, Lodge recategorized his early work on the coherer as if it were the invention of wireless rather than an exploration of Hertz's research.<sup>16</sup>

Notwithstanding his subsequent feud with Marconi over priority in the invention of wireless – or perhaps because of the moral high ground that he won from it – by 1899 Lodge had established a reputation as a public authority on electromagnetic theories and technologies, and much else besides. For example, after the Royal Society awarded Lodge the Rumford Medal, the Lord Mayor of Liverpool marked his achievement with a banquet in his honour. This drew the attention of Joseph Chamberlain, who saw in Lodge the ideal candidate for Principal of his new Birmingham University. Undeniably in tension with his ever-growing interest in spiritualism, this position enhanced Lodge's visibility as a public figure, providing opportunities for him to address the issues of the day at both local and national level. The demands of running the university meant less time for research; his tenure also encompassed the difficult years of the First World War and the death of his son, Raymond, killed at Ypres in 1916 and with whom Lodge sought spiritual contact long thereafter. Parting company with Birmingham the year after the war ended, Lodge's

retirement saw him become a renowned expert on the new media technologies of ‘wireless’ radio broadcasting in the 1920s and then of television in the 1930s. Although controversially retaining older commitments to the ether and spiritualism in an era that cherished Einstein’s secular theory of relativity, Lodge’s final years nevertheless saw him as a much respected authority, an intellect matching that of George Bernard Shaw and Winston Churchill.<sup>17</sup>

To refine such an episodic account, however, it is important to emphasize the nature and range of continuities in Lodge’s long life. His deep family connections are arguably most fundamental, especially with two women: his aunt, Charlotte Anne Heath, and the woman he married, Mary Marshall. Heath had served as a Woman of the Bedchamber to Queen Adelaide (Consort to William IV) and, after inheriting a significant sum on Adelaide’s death, settled in London and dedicated her life to educational and religious causes. She was Lodge’s most attentive aunt, nurturing the youngster’s curiosity and intellect, not least by introducing him to Royal Institution lectures as a child, and then hosting him in London for his early years as a student. It was in London that Lodge courted Marshall, whom he had known since childhood as their families were long acquainted in the Potteries. A talented artist, she started at the Slade School in London just as Lodge approached his last year studying for his Doctor of Science degree (DSc) at UCL. They were forbidden to marry until Lodge was earning £400 a year; within a few years of finishing his degree his teaching work at UCL and Bedford College was bringing in twice as much and they married in 1877.

It was a long and productive marriage. Between them, they raised twelve children (two more died as infants), six boys and six girls, born between 1878, when they were in London, and 1896, when they had moved to Liverpool. The sheer costs of managing and educating such a large household of itself readily explains why Oliver took on so many remunerative duties of science directed to utilitarian ends in his working life. These included writing numerous books, public lecturing, telecommunications consultancy and patenting far

beyond anything required by his Professorship at Liverpool or his Principalship in Birmingham. Mary influenced Oliver's work, too: although her inspiration and guidance was often tacit, it was all too evidently lost after her death in 1929.<sup>18</sup> Their children in turn, built on Oliver's research, transforming some particularly valuable innovations into long-lasting commercial businesses. Francis Brodie (born 1880) and Alec (born 1881) patented their own improved system of high-tension ignition in 1903, developing the results of Leyden jar discharges which their father had explored in his laboratory researches at University College Liverpool, and set up the Lodge Plug Company to produce spark plugs for cars and aeroplanes in 1904. Their younger brothers Lionel (born 1883) and Noel (born 1885) developed Oliver's research on dust extraction, also carried out in Liverpool, into an electrostatic technique for removing smoke, setting up the Lodge Fume Deposit Company Limited with their sister Norah (born 1894) in 1913.<sup>19</sup>

Continuity across the generations was not only manifest in the financial and technological capital that Oliver bequeathed to his children. He himself had inherited a religious framework from his senior family members. As Lodge tells us in *Past Years*, both of his grandfathers had fulfilled the double role of vicar and headmaster. His maternal grandfather was Reverend Joseph Heath of Herefordshire; his paternal grandfather, the Reverend Oliver Lodge was born in Ireland, and, with three successive wives, produced twenty-five children, the youngest of whom were raised at a vicarage in Barking in south Essex (Oliver Lodge's father was the twenty third). Young Lodge, then, entered a relatively conventional family tradition of Anglicanism, sustained by very large number of uncles, aunts and cousins.

While Lodge never lost his faith, he certainly took it in directions not previously explored in the Lodge dynasty. His first encounter with psychical research came as a student in London, far from the Potteries or grandpaternal vicarages of his childhood. At University

College, Lodge met Edmund Gurney, who was then preparing material for his *Phantasms of the Living*, published posthumously in 1886. It was through Gurney that Lodge met Frederic Myers, who would eventually become his close friend and mentor. Lodge was initially unimpressed by Gurney's work, dismissing it as a 'meaningless collection of ghost stories', and, when Gurney, Myers, and the Cambridge philosopher Henry Sidgwick founded the Society for Psychical Research (SPR) in 1882 Lodge did not join.<sup>20</sup> Drawing its membership from the middle and upper classes and rich in intellectual and social capital, the SPR was dedicated to seeking experimental evidence for psychical phenomena of various kinds. It was not until Lodge carried out his own experiments to test thought transference in Liverpool in 1883 that he began to accept the possibility of such communications and the legitimacy of scientific methods to establish evidence for them. Lodge joined the SPR that year and, to the end of his days, it remained a major organisational commitment, shaping his approach to integrated physics and spiritualism.

Lodge was by no means the only physicist amongst its membership – William Fletcher Barret, who had stayed with the Lodge family in the Potteries, was a member, as were Lord Rayleigh and J.J. Thomson – but he remained circumspect about how his researches might be received by fellow physicists. With the publication of *Raymond* (1916), however, in which Lodge recorded details of apparent contact with his son, killed in the trenches the year before, Lodge's psychical research became much more visible and prompted some to question his judgement.<sup>21</sup> Yet this strand of Lodge's work was integral to his broader understanding of the universe and, after his retirement, he embraced the opportunity to focus upon it untrammelled by the professional norms of academic science. While there were plenty of critics, Lodge's late work allowed him to set out his views regarding the philosophy of the ether to a much wider audience, granting him status as a public authority that he would not otherwise have achieved.

Although controversial, Lodge's work with the SPR nevertheless reflected a sustained practice in experimentalism he first developed as a teenager in 1869. Even as he contemplated the complexities of abstract ether theory, it was laboratory investigation, usually working with assistants or collaborators (or delegating to them), that was a major feature of his career at both Liverpool and Birmingham. Yet Lodge was not content for his work to remain in the laboratory. While at Liverpool, for instance, he gained a reputation for developing innovative demonstration models of Maxwell's theory of electromagnetism, which he employed both in the lecture hall and in his publications; meanwhile Lodge gave talks and wrote articles about the very innovations in communication media that he was working to patent with Muirhead. Over his career, his writing appeared in specialist scientific and technical journals, in newspapers, and general periodicals; he maintained extensive correspondence with friends and collaborators in all the domains of which he was interested; he wrote popular books, technical treatises, and textbooks; gave lectures in the university, at prizegivings, for various societies, and at a wide range of institutions, large and small; filed dozens of electro-technological patents; and appeared on both radio and television. Lodge, then, was adept at communicating in a range of media while, at the heart of much of what he said and wrote was his specialist research in modern *means* of communication.

Perhaps Lodge's role as a public communicator is best seen in the lectures he gave on these technical topics to broad and often non-specialist audiences. Both his Mann lectures on lightning conductors in 1888 and those on the characteristic discharge of the traditional 'Leyden jar' the following year established him as the leading interpreter of Maxwell's work and led directly to the lectures and demonstrations he gave in 1894 that, he later claimed, showed the potential for electromagnetic waves to be used for wireless signalling. These latter talks were held in a range of venues to different audiences, specialist and non-specialist: the first was the memorial lecture for Hertz at the Royal Institution on 1 June 1894; Lodge

then demonstrated his apparatus again at the annual Ladies Conversazione at the Royal Society on 13 June; and finally he gave a paper at the British Association meeting in Oxford on 14 August.<sup>22</sup>

While the move to Birmingham meant Lodge had less time to spend in his laboratory, it brought more opportunities to speak. He continued to be active in those organizations with which he was close like the British Association and the SPR (he was President from 1901-3), but he also took advantage of other opportunities. In 1903, for instance, Lodge gave a lecture on radium at Birmingham Town Hall (with proceeds going to the new university) and then repeated it again for working men, writing it up as 'Radium and Its Lessons' for the highbrow monthly *Nineteenth Century and After* and including it in the third edition of *Modern Views of Electricity*.<sup>23</sup> His position also allowed him to broaden the subjects he addressed. The year after, for instance, he gave a talk to the Ancient Order of Foresters in Birmingham entitled 'Public Wealth and Corporate Expenditure', which was published by Beatrice and Sidney Webb as Fabian Tract 121, *Public Service versus Private Expenditure*, in 1905.<sup>24</sup> The string of books Lodge published in his first decade at Birmingham also demonstrate his growing confidence to tackle subjects beyond physics. *Life and Matter* (1905), for instance, was an attack on the materialism of Ernst Haeckel; *The Substance of Faith* (1907) offered a non-denominational catechism aimed at introducing children to the essence of religion; *Man and the Universe* (1908) attempted to reconcile science and faith; and *The Survival of Man* (1909), dedicated to the SPR, set out Lodge's belief in the survival of personality after death.<sup>25</sup>

Nonetheless, his new role placed considerable constraints upon his work. Growing out of Mason College, then based in the centre of Birmingham, Lodge had to oversee the development of the new campus at Edgbaston as well as establish the University's new, broader, curriculum. He also had to negotiate his civic role, representing the University at

various events in the city and beyond. Lodge's position as Principal was made more difficult by the influence of Joseph Chamberlain, the University's founder and Chancellor. While there was a great deal of correspondence between their views on education, they differed as to how best to establish the University. To make matters more delicate, Lodge frequently had to pander to Chamberlain's resilient celebrity in Birmingham. Shortly after coming to Birmingham, for instance, Lodge was forced to tolerate the imperialistic tenor of the city-wide celebrations to mark Chamberlain's despatch to South Africa when he found himself on the organising committee in 1902. Chamberlain's stroke in 1906 allowed Lodge more independence, but at the same time it deprived the University of one of its most effective fundraisers and lobbyists.

There were, as already mentioned, significant continuities across Lodge's long life. Although he had less time to practice science, he maintained his links with scientific institutions and, after he became one of the editors of the *Philosophical Magazine* in 1911, scientific communications. He continued to speak and write, and on an increasingly wide range of topics. And his commitment to psychical research was undiminished. Yet there were also some discontinuities. While in Birmingham it is evident that he never secured the sympathy and respect of the local civic and academic community that he obviously had in Liverpool. And while John Tyndall's lectures at the Royal Institution inspired Lodge into taking up physics, he turned against both Tyndall's materialism and methods of teaching.<sup>26</sup> His adherence to ether theory and his willingness to situate the ether in spiritual terms, although consistent in itself, put Lodge at odds with many of his contemporaries, and his scepticism towards the more radical interpretations of Einstein's work, particularly that based in advanced mathematics, made him seem increasingly out of touch. Yet while Lodge might have exasperated some of the younger physics working after the First World War, his authority as a man of science remained undiminished: he remained a respected and influential

figure within scientific circles and it was to Lodge that the wider public often looked for guidance.

There were also some tensions within Lodge's principles and practices that he managed with a certain degree of pragmatism, sometimes so that he could fulfil what he saw as his civic responsibilities, sometimes for financial benefit. For instance, Lodge was adept at managing relationships with those from across the political spectrum: at the same time he was publishing Fabian tracts with Beatrice and Sidney Webb, he was also working with the Liberal Unionist Chamberlain and spending his Easters at Clouds, the locus for the aristocratic group known as the Souls that included his friend Arthur Balfour, then the Conservative Prime Minister.<sup>27</sup> He was a supporter of women's suffrage, addressing suffragist groups in Birmingham, but he also defended the suffragette Christabel Pankhurst's right to speak, hosting a debate at the University in Birmingham in 1907 after students disrupted a meeting in the Town Hall.<sup>28</sup> Lodge opposed the jingoism of the period, chairing a meeting of the Quaker delegation to Germany in 1909.<sup>29</sup> When war broke out, however, he had no difficulty dedicating himself to British Government war committees and accepting royalties from the sales of many wireless sets during the conflict. In this way, Lodge offers a stark contrast to the actions of his close friend, ally and regular correspondent Silvanus Phillips Thompson, the Quaker head of Finsbury Technical College in east London. In 1911 Thompson's righteous courtroom defence of Lodge's intellectual rights over wireless tuning against Marconi's impertinent claims was crucial in resolving that priority dispute in Lodge's favour. Yet equally robust and earnest was Thompson's refusal to participate in any aspect of the Great War, especially against the many Germans whom Thompson continued to hold in high esteem. Whereas Thompson died in near obscurity as a conscientious objector in 1916, Lodge's personality and connections allowed him to achieve success not only among scientific and technological organisation, but also to mix with all manner of people of all

social classes. Lodge's capacity to communicate with such people is a central issue in what follows.

### **Continuity and Communication**

In the quotation from Ruskin given as our epigraph, Lodge inserts '[or Tyndall's either]' in the short list of people whose writing reveals them to be disinterested lovers of science. In the dispute to which Ruskin refers, Tyndall was the antagonist, claiming Forbes had not given *rendu due credit* for his ideas about the movement of glaciers. Ruskin, while defending Forbes, was unwilling to take sides, arguing that disputes about priority were beside the point. In *Past Years*, Lodge quotes Ruskin to this effect:

I do not in the slightest degree care whether he was the first to see this, or the first to say that, or how many common persons had seen or said as much before. What I rejoice in knowing of him is that he had clear eyes and open heart for all things and deeds appertaining to his life; that whatever he discerned, was discerned impartially; whatever he said, was said securely; and that, in all functions of thought, experiment, or communication, he was sure to be eventually right and serviceable to mankind, whether out of the treasury of eternal knowledge he brought things new and old.<sup>30</sup>

By arguing that it was the honest and disinterested pursuit of science that was important, Ruskin avoided having to arbitrate in the dispute. Lodge, both in his address to the Physical and Chemical Society at UCL and the subsequent chapter of *Past Years*, endorses Ruskin's sentiments. However, alert to Ruskin's sleight of hand, Lodge ensures that Tyndall, too, is part of this pantheon of Victorian sages, erasing the dispute in the name of scientific progress.

In *Past Years*, Lodge attempted to do something similar in the way he represented his own career. In his account of the discovery of wireless, he credited Marconi with developing

the commercial technology of wireless telegraphy based on Lodge's prior experimental researches. Whereas, according to Lodge, he, Fitzgerald, and Kelvin were 'satisfied with the knowledge that it could be done', Marconi worked 'enthusiastically and persistently [...] until he made it a practical success.'<sup>31</sup> While he draws a distinction between the men of science, concerned only with knowledge, and the more practical Marconi, Lodge also concedes that he simply did not recognise 'that such a method of telegraphy would be, or might be, of international importance' (233). Nonetheless, Lodge was sure to register his contribution to the development of wireless in *Past Years*, stating clearly that he demonstrated the potential for his equipment to be used for signalling at the 1894 British Association Meeting (and so two years before Marconi appeared on the scene). Because wireless 'is of so much interest and importance' he also appended a list of significant dates that traced its origins back to Maxwell's 'Dynamical Theory of the Electromagnetic Field', presented at the Royal Society in 1864 (234-6).<sup>32</sup> Lodge's rendering of the history of wireless placed it firmly in the Maxwellian tradition and, as such, preceded both Lodge and Marconi's individual contributions. As Marconi did not have Lodge's authority as a scientist, however, let alone as an expert on Maxwellian interpretations of electromagnetism, he was further marginalised, presented as a parvenu late-comer in a continuous line of invention.

A lecture that became a chapter of his autobiography, Lodge's 'Scientific Retrospect' exemplifies the way that he was able to move between media, as well as his canniness when it came to making the most of his work. In another way, however, it exemplifies the difficulties in understanding Lodge's life. If we take either Lodge's model of scientific progress or the way he constructs the history of wireless, then Lodge himself becomes a marginal figure in a much larger story. Yet if we take Lodge as our subject, a much richer notion of the scientific life emerges. There is nothing in *Past Years*, for instance, about the circumstances in which Lodge sold his patent rights to Marconi in 1911, dissolving the

Lodge-Muirhead Syndicate and accepting a well-paid (and largely honorary) position as a consultant in his company. For Lodge, with his large family, this provided much needed financial security while ensuring his reputation as a man of science remained intact; however in selling his patent – by then the most significant wireless patent still in effect – he ceded authority to Marconi, allowing his rival to control the way that wireless was developed and so understood.<sup>33</sup> Lodge's account in *Past Years* was an attempt to reinsert himself into the history of wireless and so, in his view, reclaim the moral and scientific credit for its invention.

Our book attempts to restore the complexity of Lodge's life that is not by any means fully apparent in *Past Years*. In tracing lines of continuity, we argue, it becomes possible to understand the relationships between Lodge's different activities as well as how he adapted, or not, to the times in which he lived. Focusing on communication, we discover the source of Lodge's authority as well as the reasons for his eclipse in subsequent scholarship. These two themes run continuously through the chapters that follow and so we have organised them instead into three thematic parts. The first, 'Lodge's Lives', opens with an examination of Lodge's life as represented in *Past Years*, before providing detailed accounts of the two key phases of Lodge's career, in Liverpool and Birmingham. David Amigoni's chapter, 'Communication, (Dis)continuities and Cultural Contestation in Sir Oliver Lodge's *Past Years*' looks at the way Lodge made sense of, and represented, his life in the broader context of early-twentieth-century life-writing. Situating the book between Lodge's claims for physics and an understanding of inheritance in evolutionary terms, Amigoni traces the various paths to selfhood that Lodge himself identified and communicated. Peter Rowlands's chapter, 'Becoming Sir Oliver Lodge: The Liverpool Years 1881-1900' considers the way Lodge built a scientific reputation amongst his peers, while, at the same time, establishing himself in the city and beyond. Di Drummond's chapter, 'Lodge in Birmingham: Pure and

Applied Science in the New University, 1890-1914', turns to the second of Lodge's adopted cities, examining how he shaped both the University of Birmingham and, in turn, the idea of the modern university itself.

The second part, 'Science and Communication' focuses on Lodge's work as a researcher and populariser. Bruce Hunt's chapter, 'The Alternative Path: Oliver Lodge's Lightning Lectures and the Discovery of Electromagnetic Waves' revisits this important moment in Lodge's career, locating his work in electromagnetism in the commission from the Royal Society of Arts to lecture on lightning conductors. Lodge was much more comfortable with physical models than mathematical ones and Matthew Stanley's chapter, 'Lodge and Mathematics: Counting Beans, the Meaning of Symbols, and Einstein's Blindfold', examines the extent to which Lodge credited mathematics as a faithful representation of nature. The final two chapters in this part consider Lodge's relationship to what became the new physics. Bernard Lightman's chapter, 'The Retiring Popularizer: Lodge, Cosmic Evolution and the New Physics' consider how Lodge consolidated his position as a leading scientific commentator through a string of popular books in which he explained the latest developments in physics and his own position with regards to them. Rather than opposing them outright, Lodge believed these developments allowed him to articulate a more convincing version of his ether philosophy, one that could reconcile his faith with the results of scientific and psychical research. Imogen Clarke, in her chapter, 'Oliver Lodge: The Forgotten Celebrity of Modern Physics', looks more closely at Lodge's reputation in this period. While he is often considered to have been on the wrong side of the debates regarding first relativity and then quantum theory, Clarke shows how Lodge's view was courted, both in specialist forums and more widely.

The final part, 'Science, Spiritualism, and the Spaces Inbetween' focuses on the continuities between Lodge's scientific and psychical research. Richard Noakes's chapter,

‘Glorifying Mechanism: Oliver Lodge and the Problems of Ether, Mind, and Matter’ explores the philosophical basis for Lodge’s ether theory. Drawing on his research into electromagnetism, Noakes argues that Lodge’s ether was mechanistic, but in distinct, non-materialistic ways. Christine Ferguson’s chapter, ‘The Case of Fletcher: Shell Shock, Spiritualism, and Oliver Lodge’s *Raymond*’, situates Lodge’s book in the genre of spirit soldier biographies published during and after the First World War. Comparing the disrupted speech characteristic of shell shock to that of the séance room, Ferguson argues that Lodge conceived of the dead as traumatised survivors united by impaired communication. Georgina Byrne’s chapter, ‘Beyond *Raymond*: The Theology of Spiritualism and the Changing Landscape of the Afterlife in the Church of England’ uses Lodge’s book to examine the Anglican church’s response to spiritualism in the wake of the War. While many in the church resisted spiritualists’ pronouncements about the afterlife, others began to describe it in similar terms. The final two chapters address Lodge’s occult and uncanny ideas about communication. David Hendy, in his chapter, ‘Oliver Lodge’s Ether and the Birth of British Broadcasting’, traces the remarkable similarities between the way Lodge described the ether and the context within which the BBC was founded. James Mussell, in his chapter, ‘Body Separates: Spirit Unites’: Oliver Lodge and the Mediating Body’ uses Lodge’s ideas to interrogate materiality more broadly, describing the way Lodge conceived of the body in his time as well as asking what Lodge has to offer our own wireless age.

Born in the year of the Great Exhibition, and dying just before the London Blitz, Lodge’s career encompassed the rise of the first mass communications media. As one of the inventors of wireless, Lodge’s story is inseparable from what would become one of the defining conditions of twentieth-century modernity; as one of the thinkers of wireless, elaborating on the significance of connection, Lodge was also one of its prophets. Lodge was at the centre of much of what made the period distinct, yet Lodge’s life and career also teach

us about how such distinctness is constructed. In trying to understand Lodge, we have to reconsider notions of periodicity, why people and ideas appear to belong to one moment rather than another; we have to recognise the operation of disciplinarity, the way certain domains of knowledge or expertise appear separate or discrete; and when we trace Lodge's legacy, we learn much about who is remembered, and why. Oliver Lodge both shaped his period and how it came to understand itself; studying him today can help us understand how we do too.

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<sup>1</sup> Oliver Lodge, *Past Years* (London: Hodder and Stoughton, 1931), 340. Insertion Lodge's own.

<sup>2</sup> John Ruskin, 'Extract from *Fors Clavigera*', in M. Le Chanoine Rendu, *Theory of the Glaciers of Savoy*, ed. Edward Forbes, trans. by Alfred Wills (London: Macmillan, 1874), 206-7. The extract is from letter 34, 'La Douce Dame' (1873), see *Fors Clavigera: Letters to the Workmen and Labourers of Great Britain*, 1 (London: George Allen, 1907), 624-43, in *Library Edition of John Ruskin*, ed. E.T. Cook and Alexander Wedderburn, 27 (London: George Allen, 1907).

<sup>3</sup> For the original dispute, see Nanna Katrine Lüders Kaalund, 'A Frosty Disagreement: John Tyndall, James David Forbes, and the Early Formation of the X-Club', *Annals of Science* 74 (2017): 282-298.

<sup>4</sup> Lodge, *Past Years*, 5.

<sup>5</sup> Lodge, *Past Years*, 345.

<sup>6</sup> Oliver Lodge, *Continuity: The Presidential Address to the British Association for 1913* (London: J.M. Dent and Sons, 1913).

<sup>7</sup> Richard Noakes, 'Thoughts and Spirits By Wireless: Imagining And Building Psychic Telegraphs In America And Britain, Circa 1900-1930', *History and Technology* 32 (2016): 137-158.

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<sup>8</sup> See Stathis Arapostathis and Graeme Gooday, *Patently Contestable: Electrical Technologies and Inventor Identities on Trial in Britain* (Cambridge, MA: MIT Press, 2013), 141-174.

<sup>9</sup> J.D. Root, 'Science, Religion, and Psychical Research: The Monistic Thought of Sir Oliver Lodge', *Harvard Theological Review* 71 (1978): 245–263.

<sup>10</sup> Graeme Gooday and Stathis Arapostathis, 'Electrical Technoscience and Physics in Transition, 1880–1920', *Studies in History and Philosophy of Science - A* 44 (2013): 202–211.

<sup>11</sup> Discussion of Myers runs throughout the spiritualist discussions of *Past Years* with a dedicated discussion on p. 279. Lodge describes the effect of hearing Tyndall on pp. 55-6 and 78. Muirhead does not even appear in the index.

<sup>12</sup> *Past Years*, especially chapter 17 'Beginnings of Wireless', 225-236.

<sup>13</sup> W.P. Jolly, *Sir Oliver Lodge* (London: Constable, 1974), 222-23.

<sup>14</sup> Lodge, *Past Years*, 181.

<sup>14</sup> See Oliver Lodge, *Lightning Conductors and Lightning Guards: A Treatise on the Protection of Buildings, of Telegraph Instruments and Submarine Cables and of Electrical Installations Generally from Damage by Atmospheric Discharges* (London: Whittaker & Co., 1892). For the Maxwellian context, see Bruce J. Hunt, *The Maxwellians* (Ithaca, NY: Cornell University Press, 1991), 146-151.

<sup>15</sup> See Arapostathis and Gooday, *Patently Contestable*, 148-50.

<sup>16</sup> Oliver Lodge, *Signalling Across Space Without Wires: Being a Description of the Work of Hertz & His Successors* (London: The Electrician Printing and Publishing Company, 1898).

<sup>17</sup> Jolly, *Sir Oliver Lodge*, 224.

<sup>18</sup> Lodge acknowledged that Mary contributed an illustration of hydraulic bellows to his first and only formal text book, *Elementary Mechanics: Including Hydrostatics and Pneumatics*

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(London & Edinburgh: W. & R. Chambers, 1879). See *Past Years*, 74. She is also often mentioned in the various accounts of séance sessions in his spiritualist writing.

<sup>19</sup> Lodge Plugs Ltd, as it became, was sold to Smith Industries in the 1960s; Lodge Fume Deposit Company became Lodge Cottrell in 1921 and still exists today. K.R. Parker, *The History of Lodge Cottrell Limited: Development of Electrostatic Precipitation in the United Kingdom*, unpublished typescript, no date [1989?].

<sup>20</sup> Lodge, *Past Years*, 270.

<sup>21</sup> For instance, see Walter Cook, *Reflections on 'Raymond' [the Book by Sir Oliver J. Lodge]: An Appreciation and Analysis* (London: Grant Richards, 1917); Paul Hookham, *'Raymond': A Rejoinder Questioning the Validity of Certain Evidence and of Sir Oliver Lodge's Conclusions Regarding It* (Oxford: B.H. Blackwell, 1917); Charles Lindley Wood, Viscount Halifax, *'Raymond': Some Criticisms [On the Work of that Name By Sir Oliver J. Lodge]* (London and Oxford: A.R. Mowbray & Co., 1917).

<sup>22</sup> For details of these talks, see Peter Rowlands, *Oliver Lodge and the Liverpool Physical Society* (Liverpool: Liverpool University Press, 1990), 117-120.

<sup>23</sup> Oliver Lodge, 'Radium and Its Lessons', *Nineteenth Century and After*, 54 (1903): 78-85; Oliver Lodge, 'The Lessons of Radium', *Modern Views of Electricity*, 3rd edn (London: Macmillan and Co., 1907), 463-477.

<sup>24</sup> Oliver Lodge, *Public Service versus Private Expenditure* (London: Fabian Society, 1905). Reprinted in Sidney Webb, Bernard Shaw, Sidney Ball, and Oliver Lodge, *Socialism and Individualism* (London: A.C. Fitfield, 1908).

<sup>25</sup> Oliver Lodge, *Life and Matter* (London: Williams and Norgate, 1905); Oliver Lodge, *The Substance of Faith* (London: Methuen and Co, 1907); Oliver Lodge, *Man and the Universe: A Study of the Influence of the Advance in Scientific Knowledge Upon Our Understanding of Christianity* (London: Methuen 1908); Oliver Lodge, *The Survival of Man: A Study in*

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*Unrecognised Human Faculty* (London: Methuen and Co., 1909). See also Jolly, *Sir Oliver Lodge*, 175-8.

<sup>26</sup> Lodge's article on Tyndall for the tenth edition of the *Encyclopaedia Britannica* (1902-3) prompted threats of litigation from his widow, Louisa, and the article was replaced by an anonymous writer for the eleventh. See O.J.L. [Oliver Lodge], 'John Tyndall' in *Encyclopaedia Britannica*, 9th and 10th ed., 35 vols (Edinburgh: A. and C. Black, 1902-3), 33, pp. 517-521 and Richard Noakes, 'Glorifying Mechanism: Oliver Lodge and the Problems of Ether, Mind, and Matter' in this volume.

<sup>27</sup> For Lodge, Balfour and the Souls see *Past Years*, 220-4; Jolly, *Sir Oliver Lodge*, 115-8.

<sup>28</sup> See the clippings in the Lodge scrapbooks, Cadbury Research Library, University of Birmingham, book XIV, 46.

<sup>29</sup> Lodge scrapbooks, Cadbury Research Library, book XVI, 71.

<sup>30</sup> Quoted in Lodge, *Past Years*, 340.

<sup>31</sup> Lodge, *Past Years*, 232.

<sup>32</sup> J. Clerk Maxwell, 'A Dynamical Theory of the Electromagnetic Field', *Philosophical Transactions of the Royal Society* 155 (1865): 459-512.

<sup>33</sup> For an account of Lodge and Marconi's rival patents, see Arapostathis and Gooday, *Patently Contestable*, 141-174.