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Wothers possesses an extensive collection of rare books, and he has used these to provide many illustrations and quotations. In the main Wothers concentrates on the better-known elements; for more complete coverage the reader is referred to the monumental treatise *Discovery of the Elements* by M.E. Weeks (6th ed., 1960) which discusses every element up to Nobelium, the latest element to be known up to the time of its writing. Nevertheless Wothers has included a great deal of material in his book, and any chemist interested in the history of his subject will enjoy it. Some will wish to read it from cover to cover, while others will dip into it for information on particular elements. If anyone wants to know why manganese and magnesium have such similar names it's all there, and Wothers recounts a convoluted story with admirable clarity.

John Hudson

CHEMICAL LANDMARK PLAQUES

Chemical Landmark Plaque Commemorating H.G.J. Moseley (1887–1915): Replacement Plaque Erected in Oxford

The author observed in early 2017 that Moseley's RSC Chemical Landmark plaque, on the old Clarendon physics laboratory building in Oxford, was in poor condition. The plaque was then less than ten years old, and had been erected in a sheltered position. Nevertheless, the blue paint background was bubbling up revealing some bare metal, and the white of the raised lettering had in several places disappeared revealing underlying blue (Fig. 1).

It is with great pleasure that the author can report that the plaque has now been replaced by the RSC (Fig. 2) with the support of Professor Andrew Boothroyd of the Oxford University Department of Physics. The two plaques are identical in inscription but at the head the "RSC" logo of 2007 has been replaced by the current "Royal Society of Chemistry" logo. (Earlier in the 2000s, plaques display yet another logo, "RS•C" in distinctive font.)

Deterioration of Chemical Landmark plaques as shown in Fig. 1 is apparently not a widespread problem; there are plaques of the same general construction which are weathering well, such as the Harwell Laboratory plaque, recently moved to a more prestigious location on the Harwell Campus [1]. A more significant problem is the inconspicuousness of the earliest Chemical Landmark plaques (rectangular with black lettering on steel); replacement plaques have been made in two cases [2].

Fig 1: The plaque in March 2017. By March 2019, the area of exposed metal in the bottom left corner had increased and there was a new area of exposed metal in the bottom right corner.

Fig. 2: The replacement plaque in November 2019.

On 19 October 2016, the Historical Group (jointly with the IOP History of Physics Group) organised a meeting to celebrate Moseley's life and work [3]. After an excellent chemical education at Eton, Moseley went up to Trinity College, Oxford in 1906 with an entrance scholarship intended for those reading chemistry, but then did his First and Second Public Examinations in mathematics and physics in 1907 and 1910 respectively [4]. His work on X-ray spectroscopy, later supplemented by that of Manne Siegbann, allowed confident determination of the charge on the atomic nucleus [5]. Because the charge on the nucleus is equal to the number of electrons in the uncharged atom, Moseley's work enabled chemistry to be on an electronic footing, even before quantum mechanics was developed in 1925-1926, with notable work by Bohr, Langmuir, and Lewis. Atomic number displaced chemical atomic weight for ordering of the periodic table; the previous use of atomic weight had achieved success only because, with relatively few exceptions, atomic weight rises monotonically with atomic number. The meeting in 2016 celebrated the centenary of the year in which Moseley might well have been awarded a Nobel Prize had he not been killed in the Gallipoli campaign of 1915 [6]. As the plaque indicates, Moseley was also the father of X-ray fluorescence spectroscopy ("XRF") as an analytical tool.

The Chemical Landmarks Scheme is part of the "Campaigning and Outreach" activity of the RSC [7]. The plaques "are publicly visible, giving everyone an insight into chemistry's relevance to everyday lives." Over fifty Chemical Landmark plaques have been presented since the first in 2001 to the Johnson Matthey Technology Centre, Berkshire [8], including some outside the UK. But for at least the last eighteen months, the Scheme has been under review and applications for new plaques have not been invited.

A useful though not entirely reliable or complete list of Chemical Landmark plaques appears in Wikipedia [9], and there is also an incomplete list of RSC plaque presentations in the Thames Valley [10], each with photographs.

In addition to monitoring the condition of some existing plaques as discussed above, the Historical Group took the lead in securing the erection in 2015 of a plaque at Sir Humphry Davy's place of apprenticeship in Penzance [11].

References

1. Michael Jewess, *RSCHG Newsletter*, Winter 2019, 75, 21-31 (hard copy), 11-16 (online).

2. Alan Dronsfield *RSCHG Newsletter*, Summer 2014, 66, 51-53 (hard copy), 24-25 (online); Bill Griffith and Michael Jewess, *RSCHG Newsletter*, Winter 2018, 73, 54-57 (hard copy), 28-32 (online), see final paragraph. Circular white-lettering-on-blue plaques to Calvert, Frankland, and Dalton appear on the Wikipedia page (reference [9] below), and while they bear a sole RSC attribution they do not carry the designation "Chemical Landmark" and presumably were outwith the scheme, though contemporary or probably so.

3. Russell Egdell, *RSCHG Newsletter*, Winter 2017, 71, 35-38 (hard copy), 19-21 (online).

4. Roy MacLeod, Russell G. Egdell, and Elizabeth Bruton (eds), *For Science, King, and Country* (London: Uniform, 2018), Chapter 1 (Clare Hopkins). In Oxford, then as today, success in two "public" – i.e. university,

not college – examinations were necessary to obtain a bachelor's degree, and the subjects taken do not necessarily have to correspond. College undergraduate entrance scholarships no longer exist; but at least as late as the 1960s might be retained by an undergraduate who switched subject (author's personal knowledge).

5. MacLeod, Egdell, and Bruton, *For Science, King and Country*, Chapters 2 (Neil Todd), 3 (Kristen M Frederick-Frost), 4 (Eric Scerri), and 8 (Egdell).
6. MacLeod, Egdell, and Bruton, *For Science, King and Country*, Chapters 5 (Elizabeth Bruton) and 6 (Robert Marc Friedman).
7. https://www.rsc.org/campaigning-outreach/outreach/get-involved/, accessed 4 November 2019.
8. David Phillips for the RSC, quoted in Bill Griffith, *RSCHG Newsletter*, Winter 2015, 67, 40-41 (hard copy), 19-20 (online). Also a broken link to an RSC News item referred to against the Johnson Matthey Berkshire plaque on the Wikipedia page (reference [9] below).
9. https://en.wikipedia.org/wiki/List_of_blue_plaques_erected_by_the_Royal_Society_of_Chemistry, accessed 4 November 2019.
10. https://www.rsc.org/Membership/Networking/LocalSections/ThamesValley/TVRSCLandmarkAwards.asp, accessed 4 November 2019.
11. Michael Jewess, *RSCHG Newsletter*, Winter 2016, 69, 32-38 (hard copy), 16-19 (online).

Michael Jewess
Harwell, Oxfordshire
michaeljewess@researchinip.com

MEETING AND CONFERENCE REPORTS

William Crookes (1832-1919)

Saturday 19 October 2019, Royal Institution

2019 marked the centenary of the death of William Crookes. Journalist, chemist, photographer, spiritualist, businessman, sometime Secretary of the Royal Institution and President of the Royal Society of London, Crookes was a key figure in the science of the second half of the nineteenth century and beginning of the twentieth. On 19 October 2019 the Society for the History of Alchemy and Chemistry, the Royal Society of Chemistry Historical Group and the Royal Institution marked this anniversary by holding a meeting at the Royal Institution to examine various aspects of Crookes's extraordinary career and his place in science. Over fifty people attended the meeting, which was also part of the ChemFest celebrations of the sesquicentenary of the periodic table.

'Two Parallel Lines'? The Trajectories of Physical and Psychical Research in the Work of William Crookes

Richard Noakes (Exeter University)

In 1905 the English journalist Harold Begbie interviewed William Crookes for a leading magazine of fashionable London society. Begbie gathered from Crookes's responses that the veteran chemist regarded "physics and psychics" as "two parallel lines" that could never nurture each other. Yet Crookes seemed to hold out hope that parallelism would eventually turn to convergence with physicists' studies of the apparently immaterial basis of matter and psychical researchers' studies of the physiological basis of telepathy.

Noakes' paper argued that Begbie was either misunderstanding Crookes or Crookes was being disingenuous because Crookes's approaches to psychical phenomena had been strongly physical since the 1870s when he began systematically investigating spiritualism. This was explored in relation to Crookes' investigations of an apparent 'psychic force' exuded by the body, materialised spirit forms and 'brain wave' theories of telepathy.

William Crookes: A Life in Photo-Chemistry

Kelley Wilder (De Montfort University, Leicester)

Sir William Crookes was a well-known photographer at the beginning of his career, but he is best known for his other achievements, later in life. Wilder's paper argued that Crookes' photographic knowledge and practices informed his experimental career throughout his life, even after he apparently left mainstream photographic circles. Using notebooks and recently discovered caches of photographs, she argued for a rethinking of Crookes' use of photography throughout his lifetime, showing how everything, from his note-taking to his experimental practices was indebted to photographic practices. While half the notebooks remain secluded in the Science Museum due to concerns over radioactivity, this study will remain incomplete, but it is suggestive of new directions in understanding Crookes' various activities throughout his scientific career.