

This is the first scientific biography of Edward Frankland, probably the most eminent chemist of nineteenth century Britain. Amongst many other achievements, he discovered the chemical bond and founded the science of organometallic chemistry (both terms are his invention). A controversial figure throughout his life, he became a leading reformer of chemistry teaching and for nearly 40 years the government's close adviser on the purity of urban water supplies, arguably preventing a pandemic of water-borne disease.

From an apprenticeship in a druggist's shop in Lancaster, he proceeded to London to become assistant lecturer in chemistry to Lyon Playfair, and then to a PhD in Marburg under Robert Bunsen. After occupying the first chemical chair at Manchester he spent the rest of his career at numerous famous institutions in London, culminating at what became Imperial College. He was knighted in 1897.

Today a certain obscurity of reputation stems from the conspiracy of silence surrounding Frankland's origins: he was the illegitimate son of a distinguished lawyer. Frankland never gave interviews and posterity has had to guess about many of his activities. Recently, however, Professor Russell has gained access to a vast collection of his private papers, and has discovered several other major deposits, making the Frankland archive one of the largest collections of scientific papers to come to light in Britain this century. These have been fully examined in this new study which discloses, among much else, webs of conspiracy in the scientific community that demands a radical revision of the social history of Victorian science. Russell's authoritative and lively account of Frankland's achievements will be of great interest not only to professional chemists and historians of science, but also to general readers concerned with the social fabric of Victorian England.

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Colin A. Russell

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✦ EDWARD FRANKLAND ✦

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✦ TO JEREMY AND MELISSA ✦

Contents

<i>Preface</i>	xiii
<i>Acknowledgements</i>	xvii
<i>Chapter notes</i>	xix
1 LANCASTRIAN INHERITANCE	1
1 Putting up the shutters	1
2 The Lancaster of Edward Frankland	9
3 Journey to London	13
2 THE ROAD TO DISCOVERY	20
1 Westminster, Putney and a new acquaintance	20
2 The hunt for radicals	25
3 Cirencester	28
4 Discovery at Marburg	30
3 QUEENWOOD	38
1 Towards the Millennium	38
2 Pioneers in science education	42
3 Disharmony Hall	54
4 NEW WORLDS IN GERMANY	68
1 Return to Marburg	68
2 Research in Bunsen's laboratory	73
3 Interlude in Giessen	80
4 Sophie	83

✧ CONTENTS ✧

5	FUNDAMENTAL DISCOVERIES IN CHEMISTRY	95
1	Putney revisited	95
2	The foundation of organometallic chemistry	101
3	Foundations of the theory of valency	108
6	FRANKLAND AND THE DEVELOPMENT OF VALENCY	118
1	Constituents of a theory of valency	118
1.1	A new synthesis: radicals and types	118
1.2	Tetravalent carbon atoms	121
1.3	Chemical bonds	128
2	A prophet without honour?	129
2.1	The ambivalent rôle of organometallic chemistry	131
2.2	Radicals v. types	132
2.3	Atomic weights v. equivalents	133
2.4	The opposition of Kekulé	134
3	Vindication	138
7	MANCHESTER: 'THE EDUCATIONAL AND COMMERCIAL UTILITY OF CHEMISTRY'	147
1	Owens College	147
2	Education: professional academic	150
3	Commerce: research consultant	159
3.1	The case of 'hydrocarbon gas': analysis of coal and coal-gas	160
3.2	Forming an industrial strategy	164
4	Values, human and otherwise	176
4.1	Family	176
4.2	Religion	183
4.3	The arts	185
4.4	Away from it all	186
5	The end of the road	188
8	RETURN TO THE METROPOLIS	202
1	'Accomplished chemical pluralist'	202
1.1	St. Bartholomew's Hospital	203
1.2	Addiscombe College	208
1.3	The Royal Institution	212
2	Man of affairs	226
2.1	Family	227

* CONTENTS *

2.2	Informal scientific networks	231
2.3	Formal scientific institutions	235
9	ADVANCES IN ORGANIC CHEMISTRY	245
1	Organic chemistry before 1860	245
2	Further developments in organometallic chemistry	249
3	The lactic acids and questions of structure	254
4	Unsaturated acids and problems of reactivity	259
5	Acetoacetic ester and its reactions	262
6	The theory of structure	270
10	THE COMMUNICATION OF CHEMISTRY	281
1	The birth of Frankland's notation	281
2	Frankland and popular chemical education	286
2.1	A new audience for chemistry	286
2.2	Frankland's strategy	288
2.3	The reception of Frankland's new chemistry	298
3	Teaching at the Royal College of Chemistry	303
11	THE X-CLUB AND BEYOND	317
12	FAMILY: YEARS OF CRISIS	342
13	THE ANALYSIS OF WATER SUPPLY	362
1	Something wrong with the water?	362
2	Appointment as official analyst	365
3	New methods of analysis	372
4	The birth of a concept: previous sewage contamination	381
5	Opposition	383
6	Later analytical work	391
7	To what end?	397
14	'THE WILDEST PARTS' OF NATURE	411
1	Science from the mountains	411
1.1	Combustion rates and pressure	415
1.2	The origins of illuminating power	416
1.3	Muscular power and nutrition	421
1.4	Glaciers	426
1.5	Meteorology	429

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0521545811 - Edward Frankland: Chemistry, Controversy and Conspiracy in Victorian England -

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✦ CONTENTS ✦

2	Science from the sky	433
2.1	Telescopes on earth	433
2.2	Glaciers on the moon?	434
2.3	Helium on the sun	435
15	POWER	441
1	The Chemical Society – and Banquo’s ghost	441
2	The Institute of Chemistry – and ‘technical informality’	445
3	The Royal Society – ‘Frankland won’t do’	457
16	RETIREMENT YEARS	469
1	Reigate Hill	469
2	Abnormal happenings at a Normal School	475
3	‘Remunerative employment’	484
4	A house divided	487
5	Recognition at last	494
17	THE LAST JOURNEY	502
	<i>Index of persons</i>	521
	<i>Subject index</i>	528

Preface

The completion of this volume is, I have to confess, something of a relief. Edward Frankland has occupied a good deal of my energies and time for far too long. It is rather more than thirty years since I first encountered him, while writing my doctoral thesis on the rise and development of the fundamental chemical doctrine of valency. When I discovered that Frankland played a key part in that development, and moreover that he had been born a few miles from where I then lived, my interest greatly increased. It became clear to me that a biography of Edward Frankland was much overdue. As I came to discover, he was probably the most important figure in British chemistry in the last century, yet by a strange paradox relatively unknown today.

A good deal of work in local history (hitherto unknown territory to me) led to the book *Lancastrian Chemist: the early years of Sir Edward Frankland*, Open University Press, Milton Keynes, 1986. It seemed a worthwhile project on the grounds that a man's childhood and youth are likely to be his most formative years. Detailed research indicated that, in Frankland's case at least, this was profoundly true. In a sense the present volume is a sequel to that essay, but it is intended that it should also be complete in itself, so in the first couple of chapters those who have read *Lancastrian Chemist* may find some material that is familiar.

The reason for his failure to receive an extended biography became rapidly clear: the raw data were simply not available. To be sure, Frankland wrote his own recollections, *Sketches from the life of Sir Edward Frankland*, privately printed 1901. It had a slightly scandalous history, almost all copies being withdrawn within

✧ PREFACE ✧

months of their release, largely on the grounds that it could have contained statements that were legally damaging, in dubious taste, hurtful to relatives, or all three. An expurgated edition was issued in 1902, rather less interesting but still an enjoyable account. But there was no way in which this could be regarded as a satisfactory treatment, partly because it was never finished, but chiefly because of the inherent limitations of any autobiography. While perfunctorily contemplating the distant prospect of possibly writing my own biographical account of Frankland something happened which transformed the whole concept in a moment.

By great good fortune we (for my wife Shirley was working with me in this), came across a vast collection of Frankland papers in private hands. Knowing these existed, I should have been foolish to the point of irresponsibility to have begun any work without first examining them all. Quickly two, three and then four other deposits, all in private ownership, became known to us, taking us halfway across the world to see some of them. All major private deposits have been microfilmed, and placed on a computer data-base; in addition many other documents have come to light in learned societies, public institutions, county record offices and so on. An account of this preliminary work on the documents has already been given ('The archives of Sir Edward Frankland: resources, problems and methods', *Brit. J. Hist. Sci.*, 1990, 23, 175-185, by Colin and Shirley Russell). Only when this mass of new material had been digested was it deemed prudent to begin any major new assessment of Frankland's life and work. Indeed it is not going too far to say that the hitherto unpublished material has transformed our understanding not only of one man but also of the scientific and cultural environment in which he lived.

Thus the present book depends heavily on the several thousand documents that have come to light in the last ten or so years. I must repeat that most (about 90%) are in private ownership and they are not accessible to the general public. However almost all are on microfilm and in that form they can be readily consulted. Initial enquiries should be made to the Open University .

At the death of Edward Frankland his papers were divided between the four surviving children of his first marriage. They were:

Margaret ('Maggie'): these have since been further divided and are currently owned by two members of her family, Miss Joan Bucknall and Mrs Myra Bucknall. There are many letters and photographs and

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❖ PREFACE ❖

Maggie's invaluable *Diary*, kept over a period of over 70 years.

Fred: most of these have been destroyed many years ago, but a small residue remains in the hands of Mr and Mrs Alan Frankland.

Sophie: again many have been destroyed though a selection has been preserved by friends of one of her descendants, Mr and Mrs Patrick Campbell. They consist mainly of letters to and from Sophie in the early 1870s.

Percy: the only one of Frankland's children to follow the father's profession, Percy became Professor of Chemistry at Dundee and Birmingham. His portion of the letters is by far the largest single collection, with much of scientific interest. However even this is not as large as it once was. It is owned by Mr and Mrs Raven Frankland.

Needless to say we are greatly indebted to all the owners for permitting us to see, and then to microfilm, documents in their possession. I am deeply grateful to them all for permission to quote from their material. We owe a special debt of gratitude to Raven and Juliet Frankland for allowing access to their huge collection, for introducing us to some of the other owners, for so kindly welcoming us to their home, and for their friendship over many years.

I must also record my thanks to the Open University for supporting my research over a long time and in many ways. Their generosity has been magnificent. I am grateful to my colleagues in both Department and Faculty for support and encouragement, especially Gerrylynn Roberts and Noel Coley whose own research interests have overlapped with mine for a very long period. Others who have helped more than they know include Bill Brock and Alan Rocke. Professor Rocke has given much valuable assistance, especially in making sense of the (to me) almost illegible letters to Frankland from Kolbe, while Professor Brock helped me in the very early days to see Frankland's importance for the history of science and has since been a fount of advice and goodwill. Then, in the matter of the X-Club, I have had stimulating discussions with Jim Moore and Ruth Barton, while on that topic and related matters I have greatly profited from the work of one of my former research students, Andrew Harrison. Items of Franklandiana have come my way through the kindness of Frank James, Harold Booth, Alan Comyns, Keith Mason and John Chadwick, and other useful information has come from Ray Anderson, Alec Campbell, D G Duff, Christopher Hamlin, John Rowlinson and the late Mike Hall.

I am grateful to librarians and archivists in many places: at the Royal Society, the Royal Society of Chemistry, the Royal Institution,

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❖ PREFACE ❖

the Royal College of Surgeons of England, the Royal Pharmaceutical Society, the Royal Greenwich Observatory; at the British Library and at many central public libraries, including those in Croydon, Kendal, Lancaster, Manchester, Newcastle, Preston; at the Public Record Office at both Kew and Chancery Lane; at the Record Offices of Cumbria, Essex, Lancashire, Manchester, Nottinghamshire, Surrey; at the Auckland Public Library and the Alexander Turnbull Library in Wellington, New Zealand; at the Deutsches Museum at Munich, and the Chemical Heritage Foundation at Philadelphia; at the Science Museum, the National Railway Museum and the Geological Museum; at the Wellcome Institute for the History of Medicine and the Institute of Historical Research; at Lambeth Palace, the Friends' Meeting House in London, the parish churches of St Martins-in-the-Fields and Wimbledon, and the United Reform Church, Lancaster; at the Marquess of Salisbury's archive in Hatfield House; and at the universities of Birmingham, Edinburgh, Exeter, Lancaster, Liverpool, London, Manchester, Strathclyde and Imperial College. Above all I want to thank the staff of the libraries at the Open University and the University of Cambridge, who, in many different ways, have made my task immeasurably easier and more pleasant.

Finally it must be obvious that my greatest debt of thanks must go to my wife Shirley whose long-suffering endurance has been combined with historical expertise in her own right, and whose love and companionship have helped in a thousand ways. We were equally involved in the establishment of the microfilm archive, and she has made a far more detailed study than I of the rich source material available in the *Diary* of Maggie Frankland. So I thank her most of all.

COLIN A. RUSSELL

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Mr and Mrs Patrick Campbell

Mr and Mrs Alan Frankland

Mr and Mrs Raven Frankland

Chapter notes

The following abbreviations are used for frequently cited books:

<i>Sketches</i>	Edward Frankland, <i>Sketches from the life of Sir Edward Frankland</i> , edited and concluded by his daughters M. N. W[est] and S. J. C[olenso], privately printed 1901, 2nd edition 1902; unless otherwise stated the second edition is intended
<i>Experimental Researches</i>	Edward Frankland, <i>Experimental Researches in Pure, Applied, and Physical Chemistry</i> , van Voorst, London, 1877
<i>Lancastrian Chemist</i>	C. A. Russell, <i>Lancastrian Chemist: the early years of Sir Edward Frankland</i> , Open University Press, Milton Keynes, 1986

The common practice is followed of indicating the *Dictionary of National Biography* as *DNB*, and the *Dictionary of Scientific Biography* as *DSB*. Also PRO = Public Record Office.

All archival material in private ownership has been copied on to microfilm at the Open University. Except for two items these are identified by a reference 'OU mf', followed by a three unit number as 01.03.0456. The first entry indicates the owner, the second the microfilm number and the third the frame number of the first page. The exceptions are (1) Maggie Frankland's *Diary*, and (2) Edward Frankland's water analysis notebooks, where the date references alone are sufficient to locate an item on microfilm; these are

✧ CHAPTER NOTES ✧

indicated respectively as 'MBA' and 'RFA, OU mf 09'. Such material is indicated as follows:

- RFA: Archives of Mr & Mrs Raven
Frankland (owner reference no.: 01)
- JBA: Archives of Miss Joan Bucknall (owner reference no.: 02)
- PCA: Archives of Mr & Mrs Patrick
Campbell (owner reference no.: 03)
- MBA: Archives of Mrs Myra Bucknall (owner reference no.: 04)
- AFA: Archives of Mr & Mrs Alan
Frankland (owner reference no.: 05)

Where Edward Frankland is intended the single word 'Frankland' is generally used, except in authorship of joint papers or (in rare cases) to avoid confusion. Christian names are not usually employed in references except in the case of other members of the Frankland family.