The Politics of Chemistry

Agustí Nieto-Galan argues that chemistry in the twentieth century was deeply and profoundly political. Far from existing in a distinct public sphere, chemical knowledge was applied in ways that created strong links with industrial and military projects, national rivalries and international endeavours that materially shaped the living conditions of millions of citizens. It is within this framework that Nieto-Galan analyses how Spanish chemists became powerful ideological agents in various political contexts, from liberal to dictatorial regimes, throughout the century. He unveils chemists' position of power in Spain, their place in international scientific networks and their engagement in fierce ideological battles in an age of extremes. Shared discourses between chemistry and liberalism, war, totalitarianism, religion and diplomacy, he argues, led to developments in all of these fields.

Agustí Nieto-Galan is Professor of History of Science at the *Universitat Autònoma de Barcelona*. He has written widely on the history of chemistry and natural dyestuffs, the history of science popularisation and the urban history of science (eighteenth to twentieth centuries). In 2009 and 2018, he was awarded the 'ICREA-Acadèmia' Research Prize by the Catalan Government.

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The Politics of Chemistry

Science and Power in Twentieth-Century Spain

Agustí Nieto-Galan
Universitat Autònoma de Barcelona

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To the memory of Professor Juan Julio Bonet Sugrañes (1940–2006), a liberal chemist.

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Preface

In the autumn of 2002, I received a phone call from Ms Nuria Alomar. She introduced herself as the granddaughter of the chemist Antonio García Banús (1888–1955), whose name at that time sounded totally alien to me. She told me the fascinating story of a brilliant chemist who had left the country in 1936, at the beginning of the Spanish Civil War (1936–9), and never returned, ending his days in Venezuela in 1955. Although García Banús was an organic chemist, I could not understand why, having taken a chemistry degree myself in the 1980s with a specialisation in that field, I had never heard of him. Ms Alomar's personal papers and publications by her grandfather helped me to write an article on García Banús in 2004, which appeared in *The British Journal for the History of Science*.[1] After that experience, I soon became aware of the lack of historical knowledge about the role of chemistry in twentieth-century Spain – a century full of extremes, in which chemistry and politics intermingled profoundly. García Banús's case was to me a sort of ur-phenomenon, a seminal driving force to pursue other case studies that could one day represent a big picture of at least up until the 1980s. I am pleased to see that, many years later, that bigger picture, with all its virtues and limitations, will be unveiled through the chapters of this book.

Years after my work on García Banús, I came across other prominent Spanish chemists who seemed to have had very different profiles. José María Albareda (1902–66) had a distinguished international career in soil chemistry and later became a key figure in the research policies of General Francisco Franco's dictatorship (1939–75),[2] as well as being one of the early members of the Opus Dei congregation. Manuel Lora-Tamayo (1904–2002) made valuable contributions to organic chemistry during the dictatorship, built a prestigious research school and even became

[1] Agustí Nieto-Galan, 'Free Radicals in the European Periphery. "Translating" Organic Chemistry from Zurich to Barcelona in the Early Twentieth Century', *The British Journal for the History of Science*, 37 (2004), 167–91.
[2] Antoni Malet, 'José María Albareda (1902–1966) and the formation of the Spanish Consejo Superior de Investigaciones Científicas', *Annals of Science*, 66 (2009), 307–32.

Minister of Education and Science in the 1960s.[3] More recently, I came across the archive of the chemist Miguel Masriera (1901–81), a pupil of García Banús, who had begun a brilliant international career in the 1920s. Masriera went into exile as a result of the Civil War, and although he returned to Spain during the dictatorship, he suffered academic marginalisation and so survived professionally as a scientific journalist.[4]

García Banús went into exile in Latin America and Masriera was internally marginalised by the dictatorship, whereas Albareda and Lora-Tamayo became key agents in building Franco's regime from the inside. Although all of these different worlds seemed to me to be incommensurable a priori, the intersections of the four stories inspired not only my curiosity as a citizen, but also my deeper interest as a historian of science.

With all of these cases in mind, my colleague and friend José Ramón Bertomeu-Sánchez recently mentioned to me the case of Max Aub (1903–72), a Spanish writer and intellectual who also left the country in 1939, at the end of the Civil War, but returned to Spain for a short visit in 1969 with Franco's dictatorship still in place. On 23 August 1969, Aub landed at Barcelona Airport and stayed for three months in Spain. His experience was much more shocking and painful than he could have expected. After his bitter disappointment with the wilful forgetting of the liberal values of the 1930s and the conformism to the regime among the people he met and interviewed, Aub decided to return to Mexico. In 1971, he published *La gallina ciega* (in English, *Blind Man's Buff*), an acclaimed book that described his daily experience in those three months in Spain and the 'blindness' of the Spanish population in the face of the totalitarian web of the dictatorship.[5]

Max Aub's tragic experience reminded me of that of the chemist Francisco Giral (1911–2002), who departed into exile, having already won a chair in organic chemistry in Spain in 1936, and went on to have a very distinguished scientific career in Mexico focusing on the chemistry

[3] Agustí Nieto-Galan, 'Reform and repression. Manuel Lora-Tamayo and the Spanish University in the 1960s', in Ana Simões, Kostas Gavroglu and Maria Paula Diogo (eds.), *Sciences in the Universities of Europe, Nineteenth and Twentieth Centuries* (Dordrecht: Springer, 2015), pp. 159–74.

[4] Agustí Nieto-Galan, 'From Papers to Newspapers: Miguel Masriera (1901–1981) and the Role of Science Popularisation under the Franco Regime', *Science in Context*, 26(3) (2013), 527–49.

[5] Max Aub, *La gallina ciega. Diario español. Edición, estudio introductorio y notas de Manuel Aznar Soler* (Barcelona: Alba Editorial, 1995). I am deeply grateful to José Ramón Bertomeu for his suggestion to use *La gallina ciega* as a metaphor for the adventurous journey of the Spanish chemical community before and after the Civil War.

of natural products with strong links with industry.[6] After Franco's death in 1975, Giral reclaimed his old chair and, following a long and painful struggle with bureaucracy, he finally obtained an organic chemistry position at the University of Salamanca in 1977, where he stayed until his retirement in 1981. We can compare Aub's three months of disappointment in the Francoist atmosphere with the everyday life of Giral's four years of academic unease following the recovery of his chair. Like Aub, Giral also went back to Mexico, where he died in 2002.

With all of these biographies in mind, I found it hard to distinguish García Banús's free radical molecules and his irreversible exile, Masriera's cosmo-chemistry and his articles in censored newspapers, Albareda's study of the chemical composition of soil and his enthusiastic collaboration with the dictatorship, Lora-Tamayo's diene synthesis and his leadership in the science policies of the Franco regime, and Giral's natural products and his disappointing return from exile. Similar atoms and molecules seemed to weigh down opposing research programmes and political ideologies, and the integration of these chemicals into the dramatic political events of twentieth-century Spain seemed to be an almost impossible endeavour. This was, however, the challenge that drove me to write this book, with the hope that the pages that follow will reveal unexpected links, contradictions, polarities and essential intersections between chemistry and politics, as well as between chemistry and culture in a broad sense. García Banús, Albareda, Lora-Tamayo, Masriera, Giral and many other names that appear in the pages of this volume will trace the history of a scientific community in its struggle for professional identity throughout the twentieth century. It is through the window of these eminent names that this book reviews the history of twentieth-century Spain – and the history of twentieth-century chemistry – from a political perspective.

Preliminary scans of the primary sources for this research project soon highlighted the considerable amount of power that chemists had throughout the century in different political regimes. This is therefore a reflection on the nature of the co-production of chemistry and power in twentieth-century Spain. The book invites the reader to reflect on the political dimension of chemistry through chemists' public addresses and opinions on their own contemporaneity. It also aims to steer debates on the role of experts in different political regimes and ideological contexts, with a particular focus on the extremes of the twentieth-century totalitarian regimes.

[6] Francisco Giral, *Ciencia española en el exilio (1939–1989). El exilio de los científicos españoles* (Barcelona: CIERE/Anthropos, 1994).

This is not an exhaustive sociological study of the Spanish community of chemists in the twentieth century, but a new look at the political dimension of chemistry. Although in the following chapters the reader will find general comments and analyses of specific institutions, labs, research schools, chemical industries and university departments, the book focuses mainly on the most important agents: research school leaders, university professors, internationally distinguished scholars, industrial chemists, policymakers and chemistry teachers and popularisers in a broad sense. Equally, it pays particular attention to the role of Spanish chemists as 'co-producers of power', but also to their position as 'chemists in power': from their academic service as deans and rectors to their presence on city councils and in government cabinets. Departing from the analysis of a specific scientific community, at the same time it offers a more general approach to the culture of chemistry in the twentieth century through the international networks it created. It can therefore contribute to the enrichment of the role of chemistry in the big picture of science in the twentieth century, but also to the way in which chemistry and its practitioners shaped science and politics in twentieth-century Spain.

The book relies on an expansive range of sources: books, articles and leaflets, personal and institutional correspondence, archive documents, obituaries and public addresses, academic peer-reviewed papers and national and international secondary literature, but also on local publications, which provided very useful data. I have also benefitted from a huge amount of local secondary literature on Spanish chemistry throughout the twentieth century. In spite of the varying quality of these sources, all of the obituaries, commemorative publications, biographies, historical introductions to scientific papers and textbooks, as well as a considerable number of well-researched academic publications, have helped me to weave my own narrative. I take responsibility for the use of all of these ideas and concepts from other publications.

Unless explicitly stated, I have used the Spanish versions of first names of Catalan chemists, since this is the way in which, for most of century, they were referred to as authors of papers, books and public presentations. In personal and family relations, they used their Catalan names – for example, Enrique, 'Enric'; Fernando, 'Ferran'; and José, 'Josep'. In the Republican years (1931–9), including during the Civil War, the Catalan language was used more publically, but it was later forbidden during Franco's dictatorship.

The specific nature of chemistry as a science of matter – closely linked to laboratory culture and with its strong links to industry and its flexible, dynamic boundaries between the physical and the

biomedical sciences – has probably not helped historians, and historians of science in particular, to integrate it into the broader scenario of the twentieth century. At an academic level, there is no doubt that names such as Linus Pauling and Gilbert Newton Lewis do not belong so much within the popular scientific culture of the century as Marie Skłodowska-Curie and Albert Einstein do for the physical sciences and James Watson and Francis Crick do for molecular biology. At the industrial level, perhaps only plastics and fuel derivatives seem to count for historians from a generalist point of view when attempting to describe the twentieth century through chemicals. Nevertheless, despite these evident historiographic limitations, the use of chemical weapons in the First World War, and the involvement of the chemical industry in the Nazi regime are two striking examples to argue against those defending a non-political, neutral, technocratic status of chemistry. It is precisely the shock of the chemical war and the cruelty of the chemical holocaust that have driven me to pursue further reflection on the links between chemistry and politics – in this case, in Spain.

Acknowledgements

This book is the result of a long period of research and I feel deeply grateful to many friends and colleagues who have accompanied me over all these years and who I would like to mention here. I am indebted to my colleague Xavier Roqué at the *Centre d'Història de la Ciència* (CEHIC), *Universitat Autònoma de Barcelona* (UAB), for his support in the organisation of a series of research seminars on 'Science and Francoism' (2012–14). The seminars created a fruitful, dynamic, 'work-in-progress' atmosphere for debating new historiographical trends when tackling the role of science in Francoism, which covers a good part of the history of science in Spain in the twentieth century. Other colleagues at the CEHIC have been extremely supportive in formal and informal discussions, which stimulated further reflections for the writing of this book. Among them, I would like to mention Pedro Ruiz-Castell, Matteo Realdi, Lino Camprubí, Carlos Tabernero and Annette Mulberger. At the *Universitat Pompeu Fabra* (UPF), Antoni Malet, Albert Presas and Daniele Cozzoli's excellent work on science in totalitarian regimes has also been very useful. They have invited me to many workshops and seminars, from which my research has benefitted enormously. At the *Institució Milà i Fontanals* (CSIC), my friend and colleague José Pardo-Tomás deserves further recognition for making me aware of the links between architecture and dictatorship in his own research, but also for his illuminating discussions on the way in which the Spanish transition from dictatorship to democracy took place after 1975. Josep Lluís Barona and Alfons Zarzoso have been extremely helpful in disseminating the historiography of Spanish exile, while Borja de Riquer and Carme Molinero have offered their expertise in the historiography of Francoism. Ángel Toca's seminal papers on the history of chemical engineering and industrial chemistry in Spain have been of great value for starting to sketch out some of the main ideas of this book. Some years ago, I had the pleasure of supervising Ángel's PhD on the establishment of Solvay in Spain, and I have since then benefitted from his remarkable research skills.

I have also enjoyed the privilege of sharing research questions and projects with Joaquim Sales, who, from his professional chemistry background and his passion for history, has been working with me over the last few years on the biographies of other important Spanish chemists, such as Enrique Moles (1883–1953), Emilio Jimeno (1886–1976), Fernando Calvet (1903–88) and José Pascual (1895–1979). His recent work as a chemist–historian has been crucial for the recovery of many sources and data from the community of twentieth-century chemists at the University of Barcelona. I am particularly indebted to him, but also to my friend and colleague José Ramón Bertomeu-Sánchez, for their generous, detailed, critical comments on earlier versions of the manuscript. Equally, Xavier Roqué, Fernando Vidal, Oliver Hochadel, Clara Florensa and Santiago Gorostiza have provided useful thoughts for the preparation of the final version of this book.

Other chemists (and friends), such as Santiago Álvarez, Gemma Arsequell, Gregori Valencia, Miquel Seco and José Antonio Chamizo, have been extremely supportive during these years, in which the local history of chemistry was always present in our informal conversations. Nuria Alomar, Beatriz Moles, Francisco Barnés, José Nogareda, Manuel Tremoleda, Artur Bladé and José, Ángela, Adela and Carmen Giral have all generously contributed through interviews, providing new data on some of their relatives or even valuable autobiographical accounts. Jesús Movellán was also very supportive through personal interviews with Francisco Giral's relatives in Mexico. I would also like to thank Emilio Lora-Tamayo for allowing me access to some of his father's professional papers.

I am truly indebted to the anonymous referees who critically read my manuscript. They made very useful suggestions from which the book has benefitted. I am also grateful to the editors of the Cambridge University Press (CUP) series 'Science in History', Simon J. Schaffer and James A. Secord, for their early support for my project. Equally, Lucy Rhymer, CUP Senior Commissioning Editor for History of Science and Medicine, has been extremely helpful in all the process of assessment of my manuscript. Fiona Kelso's patient stylistic corrections have turned my draft manuscript into a readable English text, and I am truly indebted to her for her meticulous work.

I have presented papers at conferences and workshops on many of the chemists who appear in the book, particularly on García Banús, Moles, Lora-Tamayo, Masriera, Jimeno and Pascual. I have also contributed to several commemorative events, such as the centenary of chemistry studies at the Science Faculty of Granada and the 160th anniversary of Enrique Moles's birth. In Granada, I am particularly indebted to Pedro Luis

Mateo for his kind invitation and for the information he generously provided me with on the scientific repression of the city during and after the Spanish Civil War.

In the autumn of 2016, and thanks to a semester's sabbatical, my stay in Oxford as Visiting Senior Member of Linacre College was vital to outlining and writing the first draft of this manuscript. There, I had the support of my old mentor and friend, Robert Fox, whose company and fruitful, informal discussions have been crucial to my inspiration. In Oxford, the Bodleian Library staff have been extremely supportive in helping me find printed sources and manuscript material, particularly the papers of the Society for the Protection of Science and Learning (SPSL).

In terms of archive facilities, I am also very grateful to Laia Miret from the *Institut d'Estudis Catalans*, who has generously helped me to review Masriera's papers. I am also indebted to Mireia Bachs' support in the *Biblioteca de Ciència i Tecnologia* at the *Universitat Autònoma de Barcelona*. The *Universitat de Barcelona* archive was crucial for the reconstruction of García Banús's research school, the *Universidad de Navarra* for access to Lora-Tamayo's and Albareda's correspondence and the *Reial Acadèmia de Ciències i Arts* in Barcelona for Pascual's papers. The *Archivo General de la Administración* (AGA) and other Spanish public archives have also been crucial for obtaining the necessary biographical data of many of the chemists appearing in this book. The online archive of the *Junta para Ampliación de Estudios e Investigaciones Científicas* (JAE) at the *Residencia de Estudiantes* in Madrid has become an excellent resource for the reconstruction of the academic lives of Spanish chemists in the early decades of the twentieth century. Printed sources at the *Biblioteca de Catalunya* (Barcelona) were also decisive in the writing of this book.

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I have dedicated this book to my mentor in chemistry, Juan Julio Bonet Sugrañes (1940–2006), who in my youth helped me to understand the international dimension of the profession and the liberal ethos of his research school in steroid compounds. As a brilliant chemist–historian,

he made a profound mark on me and on many chemists, friends and colleagues.

Finally, and once again, my deepest gratitude goes to my family, to Montserrat and Martí, who have patiently witnessed the slow and sometimes painful elaboration of these pages, often during weekends and vacation periods, and even during hours of the day when they probably expected a bit more company.

Chronology

1898	Spanish colonial crisis. War against the USA and loss of Cuba, Puerto Rico and the Philippines
1899	Eugenio Mascareñas on the backwardness of chemistry in Spain
1903	Foundation of the *Real Sociedad Española de Física y Química* (RSEFQ) and the journal *Anales de la RSEFQ*
1905	Foundation of the *Laboratorio Químico del Ebro* (LQE)
1906	Santiago Ramón y Cajal wins Nobel Prize in Physiology or Medicine
1907	Foundation of the *Junta para Ampliación de Estudios e Investigaciones Científicas* (JAE) Foundation of the *Institut d'Estudis Catalans* (IEC)
1908	Foundation of the *Asociación Española para el Progreso de las Ciencias* (AEPC)
1909	Barcelona Tragic Week
1911	New JAE labs and *pensionados*
1914–18	First World War
1915	Antonio García Banús gains chair of organic chemistry in Barcelona
1917	Ernest Fourneau visits Spain
1921	Defeat of the Spanish Army in Annual (Morocco) First issue of the journal *Afinidad: Revista de química téorica y aplicada*
1923–30	Primo de Rivera's dictatorship
1924	First issue of the journal *Química e Industria*
1926	Enrique Moles and Miguel Catalán travel to foreign labs First issue of the journal *Ciència: Revista catalana de ciència i tecnologia*
1927	Heinrich Wieland in Spain Moles gains chair of inorganic chemistry in Madrid
1929	International Conference on Industrial Chemistry at the Barcelona International Exhibition

1930	Crisis of the monarchy and Primo de Rivera's dictatorship
1931	Victory of the Republican parties in local elections Second Spanish Republic Foundation of the right-wing movement *Acción Española*, with the chemist Antonio de Gregorio Rocasolano among its members
1932	Opening of the *Instituto Nacional de Física y Química* (INFQ, the 'Rockefeller'): Blas Cabrera (magnetism), Julio Palacios (X-rays), Miguel Catalán (spectroscopy), Julio Guzmán (electrochemistry), Antonio Madinaveitia (organic chemistry), Enrique Moles (physical chemistry)
1933	Foundation of the 'Autonomous' University of Barcelona (UAB) International Summer School of Chemistry in Santander Conservative hegemony (CEDA)
1934	9th International Conference of Pure and Applied Chemistry, Madrid (April) Political crisis: revolt in Asturias and Catalonia (October)
1935	Luis Bermejo, Antonio Madinaveitia and José Giral as nominators of the Nobel Prize of Chemistry First issue of the journal *Metalurgia y Construcciones Mecánicas*, edited by Emilio Jimeno.
1936	Electoral victory of the Popular Front (leftist Republicans and socialists) Franco's coup d'état and leftist revolution Spanish Civil War The chemists' involvement in the War The Republican government moves to Valencia
1937	Guernica bombing of civilian population by Nazi air force
1938	Battle of the Ebro Bombing in Barcelona of civilian population Franco's provisional government in Burgos
1939	Franco's victory in the Civil War Civil servant purges Foundation of the *Consejo Superior de Investigaciones Científicas* (CSIC) with chemist José María Albareda as General Secretary University purges, repression and exile of chemists J. Giral, F. Giral and A. Madinaveitia escape to Mexico as refugees
1940	First issue of the journal *Ciencia: Revista hispano-americana de ciencias puras y aplicadas*

1941	Foundation of *Instituto Nacional de Industria* (INI)
	Manuel Lora-Tamayo gains chair in organic chemistry in Madrid
	Enrique Moles jailed
	Foundation of the *Instituto de Química* in México, Madinaveitia becomes its scientific director in exile
	'Applied chemistry' at the *Patronato Juan de la Cierva* (PJC)
	First issue of the journal *Ión: Revista española de química aplicada*
1942	Iberian pact of Franco–Salazar
1943	A new university act: *Ley de Ordenación Universitaria* (LOU)
1944	Liberation of Paris
1945	J. Giral becomes president of the Spanish Republic in exile
	Miguel Masriera translates Arthur Eddington
1946	UN vetoes Francoist Spain
	Spanish chemists travel abroad (Manuel Lora-Tamayo and José Pascual)
1947	First issue of the journal *Revista de Ciencia Aplicada*
1950	First US Ambassador to Spain
	Spain joins the Food and Agriculture Organization and the World Health Organization
1952	The *Congreso Eucarístico* is held in Barcelona
	Spain joins UNESCO
1953	Vatican Concordat
	US–Spain cooperation agreement
	Spain joins the Organisation for Economic Co-operation and Development (OECD)
	Death of Enrique Moles in Madrid
1955	Spain joins the UN
	International Conference on Science Popularisation (UNESCO, Madrid)
	Death of García Banús in exile in Venezuela
	Chemical Industry Exhibition and Spanish Chemistry Book Exhibition in Barcelona
1956	First TV broadcast in Spain
	Spain joins the International Labour Organization (ILO)
1957	Treaty of Rome
	Launching of Sputnik 1
	The VIII International Conference on Astronautics is held in Barcelona
	US agreement to nuclear cooperation
1958	University student protests
	De Gaulle becomes president of the French Republic

1959	President Eisenhower visits Spain
	Official opening of the Valley of the Fallen (*Valle de los Caídos*)
	Stabilisation Plan, the liberalisation of the economy in a dictatorial context
1960	Franco visits the *Instituto Químico de Sarriá* (IQS), Barcelona
	US funding of new chemical instrumentation
	International Conference of Industrial Chemistry, Barcelona
	International chemical corporations established in Spain
1962	*Plan de Desarrollo* (Development Plan), Lora-Tamayo becomes Minister of Education and Science and gains Honorary Doctorate from the Sorbonne (Paris)
1963	Execution of the communist leader Julián Grimau
	Chemist Adolf Butenandt in Spain
1964	Franco opens a new petrochemical complex in Huelva
1965	Liberal professors expelled from universities
1966	Palomares nuclear crisis
	Death of José María Albareda
	University student revolts
1967	New university crisis
1968	Lora-Tamayo's resignation as Minister of Education and Science
	Student revolt in Paris
1969	Apollo XI, first man on the moon
	Max Aub visits Spain from exile
1970	Nixon visits Madrid
1971	Max Aub publishes *La gallina ciega*
1973	Franco's Prime Minister, Luis Carrero Blanco, killed by the Basque pro-independence organisation, *Euskadi Ta Askatasuna* (ETA)
1975	Franco's death and the transition towards a monarchic liberal democracy
1976	F. Giral and Augusto Pérez Vitoria return to Spain to recover their Republican university chairs
1978	Referendum for the approval of the new Spanish Constitution
	Amnesty Act
1981	F. Giral returns to Mexico
1994	F. Giral publishes *Ciencia española en el exilio (1939–1989)*

Abbreviations

AC	*Acción Católica*
ACNP	*Asociación Católica Nacional de Propagandistas*
ACIV	*Anales del Centro de Investigaciones Vinícolas*
AEPC	*Asociación Española para el Progreso de las Ciencias*
ANQUE	*Asociación Nacional de Químicos de España*
ARSEFQ	*Anales de la Real Sociedad Española de Física y Química (Anales)*
BIQ	*Boletín del Instituto de Química (Mexico)*
BUPUEE	*Boletín Informativo de la Unión de Profesores Universitarios Españoles en el Extrnajero*
CAMPSA	*Compañía Arrendataria del Monopolio de Petróleos Sociedad Anónima*
CEDA	*Confederación Española de Derechas Autónomas*
CID	*Centro de Investigación y Desarrollo*
CIG	*Comissió d'Indústries de Guerra*
CIV	*Centro de Investigaciones Vinícolas*
CNIQ	*Cámara Nacional de Industrias Químicas*
CNR	*Consiglio Nazionale delle Ricerche*
CNRS	*Centre nationale de la recherche scientifique*
CNT	*Confederación Nacional del Trabajo*
CSIC	*Consejo Superior de Investigaciones Científicas*
DAAD	*Deutscher Akademischer Austauschdienst* (German Academic Exchange Service)
ENCS	*Empresa Nacional Calvo Sotelo*
ENPETROL	*Empresa Nacional de Petróleo*
ETH	*Eidgenössische Technische Hochshule* (Federal Polytechnic School)
FNCE	*Fábrica Nacional de Colorantes y Explosivos*
FNICER	*Fundación Nacional para Investigaciones Científicas y Ensayos de Reformas*
IBYS	*Instituto de Biología y Sueroterapia*
IIT	*Instituto de Investigaciones Técnicas*

IUPAC	International Union of Pure and Applied Chemistry
ILE	*Institución Libre de Enseñanza*
INFQ	*Instituto Nacional de Física y Química*
INI	*Instituto Nacional de Industria*
IQ	*Institut de Química, Universitat Autònoma de Barcelona*
IQA	*Institut de Química Aplicada*
IQM	*Instituto de Química, México*
IQS	*Instituto Químico de Sarriá*
IRI	*Istituto per la Reconversione Industriale*
JAE	*Junta para Ampliación de Estudios e Investigaciones Científicas*
KWG	*Kaiser Wilhelm Gesellschaft*
KWI	*Kaiser Wilhelm Institut*
LIB	*Laboratorio de Investigaciones Bioquímicas*
LIF	*Laboratorio de Investigaciones Físicas*
LQE	*Laboratorio Químico del Ebro*
MCM	*Metalurgia y Construcción Mecánica*
MPG	*Max-Planck Gesellschaft*
MPI	*Max-Planck Institut*
PJC	*Patronato Juan de la Cierva*
QI	*Química e Industria*
RACAB	*Reial Acadèmia de Ciències i Arts de Barcelona*
RACEFN	*Real Academia de Ciencias Exactas, Físicas y Naturales*, Madrid
RSEFQ	*Real Sociedad Española de Física y Química*
SEU	*Sindicato Español Universitario*
SPSL	Society for the Protection of Science and Learning
UAB	*Universitat Autònoma de Barcelona (1933–39)*
UPUEE	*Unión de Profesores Universitarios Españoles en el Extranjero*