

Index

- α , β , and γ rays, 65
 Abelló, Juan, 146, 150, 161, 183, 230
 Abir-Am, Pnina G.
 commemorative practices, 6
 Abollado, Carlos, 146, 161
Academia de Ciencias de Cuba, 222
Academia de Ciencias de Zaragoza, 38
Academia Pontificia de Ciencias, 127–8, 130
Acción Católica, 117, 126
Acción Española, 96. *See* Rocasolano
Acción Nacional, 96
 Agell, José, 31, 35, 42–3, 146, 185
 Escola Industrial, Barcelona, 34
 industrial dream, 203
 Institut de Química Aplicada, 43, 203
 Agreement
 on tariffs and trade (GATT), 165
 US–Spain (1953), 149, 154, 162, 175
 West Germany–Spain, 181
 Agriculture, 11, 43, 45, 48, 121, 143, 178,
 200, 233
 US Department, 178
 agrochemical stations, 127. *See* Albareda
 Albareda, José María, xi, xii, xiii, xviii, 14,
 103, 110, 115–16, 129, 161
 Academia Pontificia de Ciencias, 127
 against Moles, 108
 against the INFQ, 117
 against the JAE, 118
 and Butenandt, 179
 and Ibáñez Martín, 112–13
 and Lora-Tamayo, 173
 and Opus Dei, 126, 128, 168
 and Rius Miró, 150
 and the CSIC, 112–13, 129, 135, 158
 as organic intellectual, 227
 bust, 229
 death, 174, 210
 leftist repression, 101
 network, 130, 156, 221
 right-wing Catholicism, 210
 school, 150
 science policies, 8, 134
 selection committees, 95
 soil chemistry, xiii, 127, 129, 134, 143,
 156, 220, 225
 totalitarian ambitions, 15
 Universidad de Navarra, 173
 Alcalá Zamora, Niceto, 68
 alcohol, 76, 79, 178, 185
 fermentation, 105
 Alder, Kurt, 158, 160, 171, 220
 Algerian War, 178
 alkaloids, 16, 20, 31, 50, 61, 68, 98, 104,
 150, 207
 Allardt, Helmut, 180
 Allmand, Arthur J., 97
 alloys, 81, 121–2
 ambassador(s), 177, 180
 chemists as, 15, 138, 156
 American Chemical Society, 32, 159, 197
 ammonia, 77, 91, 190
 analytical chemistry, 30, 37, 101, 103,
 209
 anarchist, 170
 brigades, 102
 CNT, 89, 92
 groups, 84, 101–2, 192
 revolutionaries, 84
 violence, 103
 workers, 87
 aniline black, 27
 antacid Alugel, 205
 anti-clericalism, 194, 225
 antiknock agent, 87
 anti-liberalism, 123, 138
 anti-Semitism, 57, 96, 194
 apoliticism, 10, 15, 18, 85, 92, 95, 103, 156,
 164, 166–7, 181, 187–8, 216–17,
 226, 228
 appeasement policies, 100
 applied chemistry, 14, 16, 32, 48–9, 55, 67,
 69, 82, 96, 109, 110–11, 113, 116,
 123, 125, 127, 134, 138, 143–6, 149,

- 155–7, 170, 179, 185, 213, 217,
 220–1, 224–5
- Arendt, Hannah, 1
- Argentina, 99
- Aries, Robert S., 152
- arms embargo, 100
- Armstrong, Henry E., 71
- Arrhenius, Svante, 24
- artificial fibres, 78, 137, 142, 182
- Artigas, José Antonio, 140
- Asociación Católica Nacional de Propagandistas* (ACNP), 92, 96, 126, 130
- Asociación Nacional de Químicos de España* (ANQUE), 159, 184
- Asturias, 55, 78, 136
- Atlante (publisher), 196, 199, 202, 224
- atomic bomb project, 154
- atomic weights, 16, 32, 34, 38, 49, 58, 61, 104, 109, 111, 118, 220, 222. *See* Moles
- commission, 32, 222
- experimental determination, 58, 61, 118, 216, 220
- ‘atoms for peace’, 8, 176
- Aub, Max, xii, xiii
- Aula de Cultura Científica*, 213
- Austria, 5
- autarchy, 14–15, 121, 137–40, 155, 158–9, 161–2, 186, 204, 207, 209, 220
- autarky, 10, 15, 134, 137–8, 158
- Azaña, Manuel, 21, 52, 98, 231
- backwardness, 10, 14, 23, 25, 27–8, 32, 39, 41, 44, 50–1, 56, 120, 154
- Badische Anilin und Soda Fabrik (BASF), 142, 147, 186, 220
- Bakelite Corporation (chemical company), 80
- Balmer, Brian
- Banco de México, 198
- Banco Urquijo, 171
- Barba, Álvaro Alonso, 118
- Barceló, José, 125
- Bargalló, Modesto, 195–6, 200, 202, 213, 225
- Barger, George, 67, 72, 105
- Barnés, Adela, 100, 194, 196, 200
- Barnés, Dorotea, 100
- Barnés, Francisco, xvii
- Barnés, Pilar, 194
- Barton, Derek, 199
- Basel, 41, 150
- Basque Country, 64
- Battle of Annual, 84
- Batuecas, Tomás, 176
- Bayer (chemical company), 183, 220
- Bayern Academy of Science, 180
- Belgium, 5, 44, 46, 107
- benzene, 27, 31, 139, 182
- Bergmann, Ernst, 194
- Berkeley, 70
- Berlin, 12, 29, 31, 142
- Dahlem, 179, 200
- Wall, 168
- Berlin, Isaiah, 189, 214
- Bermejo, Luis, 14, 36, 38, 95–6, 103, 110, 118, 138–9
- Nobel Prize nominator, 72
- biochemistry, 8, 15, 38–9, 68, 103, 105, 127–8, 179, 207. *See* Calvet, Rosasolano
- Adolf Butenandt, 179
- Hans von Euler, 105
- Kaiser Wilhelm Institute, 179
- biography, xiii, xiv, xvii, 3, 18, 126, 195, 227, 231
- biography (auto), 6
- biological chemistry, 22, 58, 128–9, 201
- bituminous slates, 141, 147, 182
- Bladé, Artur, xvii, 200
- Blas, Luis, 92, 141. *See* chemical weapons
- Bogotá, 98
- Bolívar, Ignacio, 20
- Bolívar, José Ignacio, 199
- bombing, 199
- Barcelona, 85
- civil population, 199
- Guernica, 85
- Bonet, Juan Julio, v, xviii, 232–5
- Bonino, Giovanni Battista, 3, 70, 140
- Bonn, 157
- Bosch, Carl, 190
- Bourbon Restoration, 2, 14, 25, 33, 50
- Britain, 36, 46, 83, 149, 156
- British Council, 156
- Bruni, Giuseppe, 31, 140
- Bureau of Standards, Washington, DC, 40, 46, 128
- Burgos
- government, 112, 126
- headquarters, 142
- Buscarons, Francisco, 14, 158, 209–10, 212, 214
- Bush, Vannevar, 164–5, 175, 220
- Butenandt, Adolf, 179–81, 224, 232
- Buxó, Joaquín, 145

270 Index

- Cabrera, Blas, 20, 32, 36, 38, 56–7, 61, 97, 202
 calcium carbide, 141
 calorimetry, 160
 CALTECH, 70, 160
 Calvet, Fernando, xvii, 30, 67, 99, 103–5, 110, 153, 207, 209, 212, 214
 Calvo Serer, Rafael, 191
Cámara de Comercio, Madrid, 146
Cámara Nacional de Industrias Químicas, 44, 76, 80
 Camprubí, Lino, 9
 CAMPSA, 141, 182
 Canales, Antonio, 8
 Cannon, Walter, 100
Caputxinada, La, 210
 Caracas, 98, 201–2
 Carceller, Demetrio, 142, 145, 161, 183
 Cárdenas, Lázaro, 193, 201
 carotenoids, 157
 Casamada, Ramón, 101
 Casares, José, 26, 28, 33, 115
 Castells, José, 186
 Catalan
 chemical entrepreneurs, 45
 chemical industry, 203
 Front popular, 87
 government, 64–5, 90, 200. *See*
 Generalitat de Catalunya
 industry, 171
 journals, 200
 language, xiv, 96
 names, xiv
 separatism, 103
 university system, 96
 Catalan Society of Biology, 72
 Catalán, Miguel, 20, 30, 56, 62, 93, 103, 105–6, 110–11, 161, 199, 206–7, 214, 220
 and del Campo, 34
 multiplets, 30
 repression, 105–6
 spectroscopy, 57, 59, 62, 103
 Catalanism, 23, 65, 90, 105, 203–4, 225
 scientific, 204
 catalysis, 159–60
 Catholic chemists, 16, 44, 80, 82, 112, 115, 221
 Catholicism, 96–7, 101, 116, 126–7, 130–1, 134–5, 165, 172, 210, 225
 cellulose, 66, 78, 89, 121, 136, 139, 170, 185
 censorship, 153, 165, 174, 192, 194, 212
 Centre de chimie théorique de France, 160
Centro de Estudios y Experiencias (La Maraños), 86
Centro de Investigación y Desarrollo (CID), 171. *See* Pascual
Centro de Investigaciones Vinícolas, 79
Centro Español de Plásticos, 144
 Chalonge, Daniel, 109
 Chattaway, Frederick Daniel, 29, 99, 104–5. *See* Calvet
 chemical community, 4–5, 9, 14, 24, 40, 68, 71, 84, 110, 189, 191, 221, 226
 and religion, 126
 division, 14, 191
 European, 5
 exile, 16, 197
 identity, 5, 8, 225
 international, 39
 Latin American, 213
 Mexico, 228
 public rituals, 20
 repression, 93
 Republican values, 103
 scientific culture, 111
 wounds, 231
 chemical diplomacy, 155–62
 chemical engineering, xvi, 46, 138, 149–54, 173, 201, 212, 218, 232
 and Ángel Vián, 151–2
 and Antonio Rius Miró, 150–1
 textbooks, 151
 Yale, 153
 chemical gases, xv, 54, 86, 89–90
 chemical industry, 40–50, 73–81
 chemical training, 14, 24, 43, 50, 147, 149, 157, 216, 221
 chemical war, xv, 54, 85, 92
 chemical warfare, 85
 chemical weapons, xv, 14, 16, 64, 68, 83–6, 89, 90, 92, 141, 219
 chemist-historians, xvii, xviii, 6, 55, 202, 222, 226, 233
 chemistry-based industry, 25, 167
 chlorine, 85, 92, 182
 citizen scientists, 13, 226. *See* Mark Walker
 city mayors, 14
 civil defence, 86–7
 civil discourse, 10. *See* Thomas Glick
 Civil War, xi, xii, xiv, xviii, 2, 4, 7, 9, 13–14, 16, 18, 20, 28, 38, 72, 76, 78–80, 82, 84, 93, 99, 103, 105, 109, 111, 116–7, 129, 130, 138, 217
 academic repression, 17, 93, 99, 110
 and the Jesuits, 102, 145
 chemical, 84–93
 exile, 16, 191–202

- German firms, 142
 heroes, 142
 industrial effort, 227
 INFQ, 152
 Lora-Tamayo, 136, 157
 Madrid resistance, 100
 Opus Dei, 113, 126, 128
 victims, 18
 war weapons, 217
 cleansing
 commissions, 95
 committees, 96, 110–11
 process, 103
 coal, 9, 47, 49, 78, 113, 121, 136, 139,
 140–3, 147, 149, 182–3
 mines, 139
 coal tar, 47, 49, 139
 co-evolution, 137, 192
 Cold War, 1, 9, 15, 165, 166–8, 216–7
 allies, 175–81
 anti-communism, 212, 215
 defence policies, 168
 logic, 155, 165
Colegio de Estudios Superiores de Deusto, 173
Colegio de México, 197
 Coleman, Kim, 85
 collectivisation, 84
 Collège de France, 107
 colloid chemistry, 32, 38–9, 127, 143, 199
 Colombia, 99, 195, 200–1
 colonial crisis, 7, 22
*Coloquios Íntimos de Estudios
 Norteamericanos*, 176
 Columbia University, 34, 46
 combustibles, 113, 136, 139–40, 183
*Comisión Impulsora y Coordinadora de la
 Investigación Científica*, 198
Comissió d'Indústries de Guerra, 87
Comité Conjunto Hispano Americano, 176
*Comité Iberoamericano de Publicaciones
 Científicas*, 198
 communism, 9, 86, 91, 100–3, 155, 158,
 168, 170, 175, 192, 212, 215
*Confederación Española de Derechas
 Autónomas (CEDA)*, 65
Confederación Nacional del Trabajo (CNT),
 87, 89, 92
Consejo de la Economía Nacional, 49
Consejo Nacional de la Industria Química, 121
Consejo Superior de Investigaciones Científicas.
 See CSIC
Consell d'Economia, 90
Consell de Sanitat de Guerra, 87–8
 Consiglio Nazionale delle Ricerche, 3, 136
 Constitution of Cádiz, 190
 contraceptive pill, 199
Contubernio de Munich, 168
 coordination complexes, 29, 94
 co-production
 chemistry and power, xiii, 14
 physics and power, 9
 science and power, 17, 193
 corporate chemistry, 181–7
 corporations, 166, 176, 183, 186, 188,
 217, 220
Cortes Españolas, 115, 123, 146,
 172
 cortisone, 195, 198
 cosmochemistry, 104, 109
 cosmopolitanism, 14, 16, 26–33, 54–5, 81,
 103, 168, 202, 212, 221, 225. See *Junta
 para Ampliación de Estudios (JAE)*, See
 League of Nations
 Coulson, Charles Alfred, 160
 craftsmen, 225
 Crick, Francis, xv
 Cros (chemical company), 48, 76, 145,
 182–3
 Crowther, James Gerald, 52
 CSIC, 108, 112–3, 116–18, 126, 129,
 134–5, 144–6, 149–50, 155–6, 158–9,
 161, 170–82, 186, 206, 220–21, 224,
 227, 229–30
 Cuba, 22, 168, 222
 customs laboratory. See *Buscarons, Le
 Boucher*
 Czech Republic, 5

 Daudel, Raymond, 160
 DDT, 209
 de Elhúyar, Fausto, 55, 225
 de Elhúyar, Juan José, 55, 225
 De Gaulle, Charles, 178
 de la Cierva, Juan, 113, 229
 Ynfiesta, Juan Luis de la, 144
 de Riquer, Borja, xvi, 18
 de Salas, Eduardo, 99
 Debye, Peter, 171
 Dehon Little, Arthur, 151
 Deichmann, Ute, 3–4
 del Amo, Gregorio, 98
 del Campo, Ángel, 29–30, 32, 34, 62, 66–7,
 103, 125, 228. See *Catalán
 spectroscopy*, 34
 del Fresno, Carlos, 67, 78
 del Río, Andrés, 55, 202, 225
 Delarue, Dieter, 31
 Delgado, Joaquín (anarchist), 170
 demographic growth, 171–2, 217
 Denmark, 5, 56

272 Index

- depolitisation of the culture, 165. *See* Tony Judt
Deutsche Chemische Gesellschaft, 32
Deutsche Gesellschaft für Dokumentation, 181
Deutscher Akademischer Austauschdienst, 156
 Development Plan, 166, 173–4, 183
 developmentism, 166, 187, 217, 227
 Dexter Award, 197
 diene synthesis, xiii, 17, 171, 217, 220
 diplomacy
 chemical, 138, 155–61, 221
Diputació de Barcelona, 129, 145
Dirección de Guerra Química de la Armada, 85
 dissent, 16
 academic, 210
 liberal, 16, 53, 174, 192, 200, 202, 223
 distillation, 151, 182
 bituminous coal, 49
 bituminous slates, 147, 182
 coal tar, 49, 121
 lignite, 139, 142
 vacuum, 35
 wool, 77
 Djerassi, Carl, 198
 Dodge, Barnett F., 152–4, 212. *See*
 chemical engineering
 Dow (chemical company), 80, 183, 185
 Drucker, Carl, 62
 DuPont (chemical company), 80–1, 99,
 183, 220
 dyestuffs, 20, 24, 27, 31, 41, 47–8, 61, 77,
 89, 186

 economic growth, 116, 138, 166, 169, 214
 economic historians, 76, 155, 168, 219
 edaphology, 136, 143, 156
 Edgerton, David, 11, 83
 Edinburgh, 29
 Royal Society of, 159
 University of, 72, 105
 Education and Science
 Minister, 13, 168–9, 174, 217, 228. *See*
 Lora-Tamayo
Eidgenössische Technische Hochschule.
 See ETH
 Einstein, Albert, xv, 12, 100
 Eisenhower, Dwight D., 162
 electricity, 34–6, 48, 57, 121
 electrochemistry, 62, 92, 122, 128,
 150, 160
 chair, 62
 laboratory, 59
 section at the INFQ, 57
Electroquímica de Flix, 182

Empresa Nacional Calvo Sotelo, 147
Energía e Industrias Aragonesas, 91
 Enlightenment (new), 55–64
 Enlightenment, 6, 55, 214, 218, 225
 ENPETROL, 182
Escola d'Enginyers Industrials, Barcelona, 89
Escola d'Enginyers Tèxtils de Terrassa,
 41
Escola de Directors d'Indústries Químiques,
 Barcelona, 35
Escola Industrial, Barcelona, 34, 42
 Escrivá de Balaguer, Josemaría, 113,
 126, 128
Escuela de Oficiales de Guerra Química de
Toledo y Salamanca, 92
Escuela Industrial, Madrid, 150
Escuela Nacional de Ciencias Biológicas,
 Mexico, 194
Escuela Nacional de Ciencias Químicas,
 Mexico, 197
Estatut d'Autonomia (Catalonia), 64
 ETH, 12, 29, 32, 35–6, 41, 50, 57, 156–7,
 160, 202, 232–3. *See* García Banús. *See*
 Bonet
 Ethiopia, 140
 ethos, xviii, 9–10, 13, 16, 53, 116, 126, 134,
 191–2, 199, 213, 219, 229
 chemical community, 9, 13, 116, 126,
 191, 229
 exiled chemical community, 16, 195,
 197, 213
 liberal, xviii, 10, 16, 192, 213
 Mertonian, 219
 religious, 134
 republican, 53
 ethyldichlorarsine, 85, 87
 ethylene, 132, 159, 182–3
 exile, xii, xiii, 14–15, 18, 21, 93, 95,
 97–101, 106, 109–11, 115, 171, 213,
 224, 229
 British aid, 98
 chemical community, 4, 16,
 192–202, 225
 historiography, xvi
 Nazi Germany, 100
 Republican government, 13
 university, 228. *See* Francisco Giral
 explosives, 44–5, 76, 83, 89–101, 137, 213

Fábrica Nacional de Colorantes y Explosivos,
 77, 91, 145
Fábrica Nacional de Productos Químicos, 84
Fabbriche Riunite Agricoltori Italiani
 Fagés, Juan, 24
Falange, 123, 125, 142, 172

- fascism, 3, 9, 65, 84, 100, 103, 116, 137, 139–40, 189, 202, 214, 223, 227
antifascist manifestoes, 98, 103
antifascist resistance, 100
fascist chemistry, 116–26
fascist Italy, 3, 54, 65, 136–40, 155, 162
Nazi Germany, 65, 100, 138, 155, 162
fellow travellers (scientists as), 3, 156, 188
Fernández, José Ignacio, 160, 176
Fernández, Obdulio, 27–8, 40, 66–7, 81, 102
Fernández-Ladreda, José María, 13, 92, 96, 126, 142, 151–2, 159, 230
Ferran, Antonio, 34
Ferrer Pi, Pedro, 177
fertilisers, 76–7, 89, 137, 140, 143, 182, 231
phosphate, 154
soil chemistry, 127
First World War, 29, 66, 68, 76–7, 131, 216–17
chemical weapons, xv, 14, 54, 65, 83, 92
drug shortages, 204
Fritz Haber, 84
Hugo Stolzberg, 84
mustard gas, 85, 206
nationalism, 3
Spanish neutrality, 26
technocracy, 163
Fischer, Emil, 29, 190
Fischer–Tropsch process, 139, 142–3
Fleming, Alexander, 207
Folch, Rafael, 229
Font, Josep, 176
Food and Agriculture Organization (FAO), 200
food chemistry, 193, 200
Fordism, 163
Foster, Mary Louise, 63, 73
Fourneau, Ernest, 29–30, 48, 58, 71, 98, 108
Fowler, Alfred, 30, 62
France
diplomacy, 155
Front populaire, 193
Third Republic, 53, 192
Franco, Francisco, 97, 121, 171, 231
and Adolf Butenandt, 179–80
and Antonio Rius Miró, 150
and Benito Mussolini, 91
and Emilio Jimeno, 118
and José Antonio Suanzes, 137
and Juan Abelló, 146, 150
and Juan de la Cierva, 113
and the Count of Godó, 110
and the IQS, 177
and the Society of Jesus, 178
award (*premio*), 123
cabinet, 14, 17, 107, 168, 170, 228
chemical entrepreneurs' support, 183
coup d'état, 82–5, 103, 118, 166, 229
death, 166, 173, 200, 214, 221, 235
victory in 1939, 129, 165, 170, 191
Franco's dictatorship, xi, xii, xiv, 2, 7–8, 10, 13–18, 73, 80, 155, 161, 166, 168, 179, 187, 190–3, 203–4, 210, 213, 217, 219–21, 224, 229–30, 232, 234
Francoism, xvi, 9, 17, 19, 110, 123, 126–7, 138, 147, 212, 214, 221, 224, 225, 227
Francoist chemists, 38, 115–16, 126, 134, 138–9, 156, 187, 214, 219, 222–5, 230
free radicals, 35, 41, 225
Freiburg, 31, 36
fuel, xv, 78, 139–40, 142, 154, 171
for planes, 90
gasogen, 141
planes, 87, 89
synthetic, 77, 147
full professors (*catedráticos*), 172
Fundación del Amo, 98
Fundación Nacional para Investigaciones Científicas y Ensayos de Reformas (FNICER), 78, 81, 193
Galicia, 105
García Banús, Antonio, xi–xiii, xvii, 32, 50, 64, 105, 110
and Fernando Calvet, 105
and Juan Julio Bonet, 234
and Julius Schmidlin, 41
and Miguel Masriera, 36, 87
Colombia, 200
exile, 98, 115, 157
free radicals, xiii, 35, 41, 225
Institut de Química, 64
research school, 39, 98
García Lorca, Federico, 93, 98
García, Gumersindo, 123. *See Falange*
gas masks, 83, 85
gasogen, 18, 140–1
gasoline, 137, 139, 141, 143
artificial, 89
general chemistry
chair, 38, 93, 200
laboratories, 34
subjects, 22
textbooks, 29, 196
General Electric, 1, 80
Generalitat de Catalunya, 64
Geneva, 29, 31, 38, 157

274 Index

- Geneva Protocol, 85
 German Federal Republic, 180–1
Gesellschaft für Chemische Industrie (Basel), 41
 Gil, Salvador, 126
 Giral, Francisco, xii, xiii, xvii, 13, 20–1, 53–4
 and Artur Bladé, 200
 and James Gerald Crowther, 52
 and Lázaro Cárdenas, 227
 and Lidia Rodríguez Hahn, 199
 and the Soviets, 53
 at La Marañosa, 86
 Ciencia española en el Exilio, 93
 disappointment, 215, 229
 exile, 110, 194–5
 exile university, 226, 228
 natural products, 111
 return to Spain, 213
 Giral, José, 13–14, 33, 193, 202
 and Obdulio Fernández, 103
 exile, 110
 industrial entrepreneurship, 73
 Minister of the Navy, 85
 Nobel Prize nominator, 72
 Spanish Republic, 52
 Spanish Republic in exile, 193
 Glick, Thomas, 9–10
 Gmelin Institute for Inorganic Chemistry, 180
 Godó, Count of, 110
 Gómez, Amparo, 8
 González Barredo, José María, 128–9
 González Núñez, Fernando, 97
 González, Adolfo, 58, 206
 Gramsci, Antonio, 226
 Granada. *See* Jesús Yoldi. Adolfo Rancaño
 Pharmacy Faculty, 72
 Science Faculty, xvii, 62, 72
 Granados, Francisco (anarchist), 170
 Grimau, Julián, 170
 gunpowder, 76, 89, 213
 Guye, Phillipe, 29. *See* Moles
 Guzmán, Julio, 34, 38, 57, 59, 92, 125
 electrochemistry, 62
 gyroplane (autogiro), 113. *See* Juan de la Cierva

 Haber, Fritz, 29, 66–7, 190
 and Hugo Stolzenberg, 84
 Nobel Prize, 83
 Haber–Bosch (process), 77
 Hahn, Otto, 160
 Haldane, John B.S., 100

 Heisenberg, Werner, 156
 Herf, Jeffrey, 133
 Herrán, Néstor, 8–9
 Herrera Oria, Ángel, 96
 historiography, 9
 of chemistry, 12
 of exile, 203
 of Francoism, xvi, 9
 of Spanish exile, xvi
 history and memory, 228–31
 Hoechst (chemical company), 183, 185, 220
 Hönigschmid, Otto, 57
 honorary doctorate, 71–2, 109, 130, 160, 178–9, 181
 hormones, 129, 157, 179, 198, 206, 213, 220, 232
 Howard, Frank A, 137. *See* autarky
 Huelva
 industrial area, 72, 74, 185
 pyrites, 76, 185
 hydrogenation, 61, 78, 89, 139, 141, 143, 147, 182, 198

 I.G. Farben, 48, 77, 142, 190
 Ibáñez Martín, José, 112–13, 116, 118, 161
 Ibarz, José, 176
Ibys, Instituto de Biología y Sueroterapia, 183, 204–6
 ideological agents
 chemists as, 13, 116, 226, 231
 Imperial Chemical Industries (ICI), 99, 183, 200
Industria Nacional Química Farmacéutica, 195
 industrial chemistry, xvi, 40–50, 79, 81–3, 121, 123, 149, 154, 156, 170, 219
 chair, 151, 174
 conference, 49, 146, 171
 courses, 34
 doctorate programme, 150
 encyclopaedia, 44
 experimental training, 34
 International Society for, 187
 journals, 219
 research, 121–2
 secrets, 225
 Silver Age of, 54, 73–82
 training, 138, 161
 industrial shelters, 203–9. *See*
 Ibys, Zeltia
 INFQ, Madrid, 7, 14, 16, 36, 54, 56–7, 59, 61–7, 71, 78–9, 95–7, 100–1, 103, 105–10, 117–8, 128, 135, 152, 198, 206, 217, 220–21, 224, 229
 Ingold, Christopher, 29, 99, 157–8,

- inorganic chemistry, 70, 78, 113, 180
 Adela Barnés, 196
 chair, 26, 36, 38, 109, 123, 213
 Emilio Jimeno, 46
 laboratories, 64
- insecticides, 49, 154, 185, 220
- Instituto Politécnico Nacional*, Mexico, 199
- Institución Libre de Enseñanza*, 21, 96, 106
- Institut Català de Cultura*, 200
- Institut d'Estudis Catalans*, xviii, 23
- Institut de France*, 112
- Institut de Química*, 64, 87
- Institut de Química Aplicada*, 27, 43, 203
- Institut the Fisiologia*, 200
- Instituto de Catálisis y Petroleoquímica*, 183
- Instituto Alonso Barba*, 118, 129, 144, 150, 157, 170, 181
- Instituto Cajal*, 129
- Instituto de Biología y Sueroterapia*. *See* Ibys
- Instituto de Edafología*, 129, 144
- Instituto de Estudios Pirenáicos*, 127
- Instituto de Industrias Pesqueras*, 136
- Instituto de Investigaciones Astronómicas*, 161
- Instituto de Investigaciones Químico Industriales*, 121
- Instituto de Investigaciones Técnicas*, 170
- Instituto de Investigaciones Textiles*, 136
- Instituto de la Grasa*, 136, 144, 179
- Instituto de Metalurgia y Mecánica*, 80
- Instituto de Química* (Mexico), 224
- Instituto de Química aplicada* (Oviedo), 78
- Instituto de Química Física Rocasolano*, 118
- Instituto de Química Orgánica*, 117
- Instituto de Tecnología Alimentaria*, 136
- Instituto del Carbón*, 78, 136
- Instituto del Combustible*, 143, 147
- Instituto del Hierro y del Acero*, 122
- Instituto Físico-químico*, 43. *See* Novellas
- Instituto Nacional de Edafología y Agrobiología*, 127
- Instituto Nacional de Física y Química*, Madrid. *See* INFQ
- Instituto Nacional de Higiene*, 204
- Instituto Nacional de Industria* (INI), 122, 137
- Instituto Nacional del Libro Español*, 149
- Instituto Politécnico Nacional* (IPN), Mexico, 193, 194
- Instituto Químico de Sarriá* (IQS), 44, 132, 145, 177, 232
- Technical Services, 130
- Instituto Químico-técnico*. *See* Novellas
- instrumental revolution, 11, 176, 216
- intellectuals, 21, 120, 214
 and Republican elites, 192
 and the SPSL, 98
- chemists as, 13, 16, 217, 226–8
- Francoist, 112
- liberal, 231
- organic. *See* Antonio Gramsci
- repression against, 194
- silent resistance, 214
- International Agency for Development, 177
- International Conference, 48, 66, 138, 149, 156, 162, 224
- American Chemical Society, 159
- industrial chemistry, 146, 171
- IUPAC, 14, 69, 77, 84, 102, 109, 221–2
- of History of Science, 63
- on coal, 139
- on industrial chemistry, 48
- on oligo-elements, 128
- UNESCO, 161, 213
- International Education Board, 55, 107
- International Exhibition
 Barcelona 1929, 32–3, 46–9
 Philadelphia 1926, 32
- International Monetary Fund, 165
- International Olympic Committee, 145
- International Union of Pure and Applied Chemistry, 69, 157. *See* IUPAC
- isotopes, 68, 70, 99, 101
- Istituto di chimica industriale*, Milan, 78
- Istituto Nazionale Medico Farmacologico Sersono*
- Istituto di chimica*, Rome, 140
- Istituto Seroterapico Milanese*
- Istituto per la ricostruzione industriale*, 137
- IUPAC, 32, 67, 70, 222
- Amsterdam Conference, 222
- Stockholm Conference, 160
- Washington Conference, 222
- Izquierda Republicana*, 62, 93, 106, 108
- Jeger, Oskar, 232–3
- Jesuit chemists, 46, 102
- Jimeno, Emilio, xvii, 14–15, 46, 81–2, 95–6, 110–11, 139, 159, 223
- and José Ibarz, 176
- anti-Catalanism, 96
- anti-liberalism, 120
- cleansing committees, 110
- conservative ideology, 118
- metallurgy, 46, 80
- National Bureau of Standards, 128
- rector, 139
- school, 80
- support to the IQS, 102
- totalitarian chemistry, 120, 122, 126, 129, 210

276 Index

- Joliot-Curie
Frédéric and Irene, 109, 212
laboratory, 99
Joliot-Curie, Frédéric, 107
Judt, Tony, 165, 170
Junta para Ampliación de Estudios e Investigaciones Científicas (JAE), xviii, 7–8, 14, 16, 23–25, 28, 30–3, 39, 41, 46, 50, 53–6, 62–3, 65, 72–3, 76, 78, 81, 95–8, 103, 105–6, 112, 116–18, 120, 134, 138, 150, 156, 158, 200, 202, 214, 216, 218, 223–4, 232, 234
- Kaiser Wilhelm Gesellschaft, 136
Kaiser Wilhelm Institute for Biochemistry, 179
Kamerlingh-Onnes, Heike, 24
Karrer, Paul, 71, 157, 233
Kragh, Helge, 5
Krauch, Carl, 190
Krause, Friedrich, 53
Krausism, 53–4, 81–2, 97, 214
Krige, John, 11
Krupp–Renn process, 143
Kuhn, Richard, 20, 70, 233
and Francisco Giral, 20
- Laboratori d'Estudis Superiors de Química*, Barcelona, 35
Laboratori de Química Orgànica, Barcelona, 89, 90
laboratories, 2, 6, 12, 14, 29–30, 33, 35–6, 43–4, 50, 63, 78–9, 81, 107, 109, 111, 118, 121, 153, 200, 207, 221, 223, 233
culture, xiv, 58
customs, 95, 209
equipment, 25, 97, 176, 232
ETH, 29
experiments, 79
facilities, 153
INFQ, 59
pharmaceutical, 78
reforms, 23, 28, 42, 54
research, 123
Residencia de Estudiantes, 34
scale, 83, 92, 216
Science Faculty, Madrid, 37
steroids, 233
training, 42
university, 79
Laboratorio de Investigaciones Bioquímicas, Zaragoza, 38
Laboratorio de Investigaciones de Química Orgànica, Mérida (Venezuela), 201
Laboratorio de Investigaciones Físicas (LIF), Madrid, 34, 57
Laboratorio Químico del Ebro, 44
Laboratorios Andreu, 78
Laboratorios Esteve, 77
Laboratorios Hormona, 195
Lain Entralgo, Pedro, 191
Langmuir, Irving, 1, 165
Le Boucher, León, 94
Le Chatelier, Henry-Louis, 24, 71
League of Nations, 54, 85–6, 191
Leipzig, 12, 29, 38, 57, 62
León, Andrés, 58, 98, 103, 207
Leuven/Louvain, 157
University, 44
Lewis, Gilbert Newton, xv, 32, 70
Lewis, Warren, 151
Ley de Ordenación Universitaria, 115
liberal chemistry, 29, 33, 68, 191, 203, 213
liberalism, 14, 116, 124, 189–91, 214–5, 227
economic, 121
Liga protectora de la población civil contra de la guerra química, 85
Lipperheide, José, 145, 183
Llopis, Antonio, 76–7, 80
London, 29–30, 63, 199
Imperial College, 49, 101
University College, 97, 175
López Rodó, Laureano, 166
Lora-Tamayo, Emilio, xvii
Lora-Tamayo, Manuel, xi–xiii, xvii, 15, 95, 110, 115–17, 125, 134, 173, 222, 224
Academia Pontificia de Ciencias, 127
and Adolf Butenandt, 179
and Christopher Ingold, 157
and fascist Italy, 139
and Francisco Buscarons, 214
and Franco, 170
and José Pascual, 115, 126, 170
and Kurt Alder, 171, 220
and León Le Boucher, 95
and Opus Dei, 168
applied chemistry, 125
applied science, 183
as chemist-historian, 222
as organic chemist, 146
as organic intellectual, 227
autarky, 136
books to the Caudillo, 156
Catholic universities, 173
diene synthesis, xiii, 217
diplomacy, 155
European journey. *See* José Pascual
history and memory, 230

- industrial chemistry, 161
Instituto Alonso Barba, 144
 IUPAC Conference (Amsterdam), 222
 political neutrality, 157, 167, 172, 187
 resignation, 174
 school, 144, 158, 178
 technocracy, 167–75, 228
 university reform, 172
 university repression, 210
 visit to Germany, 179
 lubricants, 143, 147, 182
- macromolecules, 31, 157
 Madinaveitia, Antonio, 20, 30, 33, 59,
 66–7, 93, 110, 115
 and Adolfo González, 206
 and Ignacio Ribas, 98
 and Richard Willstätter, 57
 and the INFQ, 58, 78–9
 and the LIF, 34
 as Republican chemist, 53, 65, 82, 97,
 103, 225
 chemical weapons, 86, 92
 exile, 194–5, 213
 industrial chemistry, 81
 Instituto de Química, 197, 199
 natural products, 111, 220
 Nobel Prize nominator, 72
 school at the INFQ, 58, 61
 Madinaveitia, José, 206
 magnetism, 36, 57
 magnetochemistry, 34, 38
 Malet, Antoni, 8
 Mallorca, 102
 Manchester, 99
 Manhattan Project, 100. *See* Harold C. Urey
 Marañón, Gregorio, 206
 March, Juan, 142, 176–7, 232
 Marcilla, Juan, 79
 Marconi, Guglielmo, 139
 marginalisation, xii, 15, 84, 109–10, 151,
 206–7, 222–3
 Marker, Rosell, 195
 Marquina, Mariano, 34
 Martí Franquès, Antoni de, 55, 225
 Martín Panizo, Fernando, 141
 Marxism, 52–3, 63, 82, 201, 214. *See* John
 B. S. Haldane
 Mascareñas, Eugenio, 26, 28
 Masonry, 95–6, 108, 118, 225
 Masriera, Miguel, xii–xiii, 110, 154, 213–14
 and Antonio García Banús, 36
 and José Pascual, 89
 cosmochemistry, xiii, 104
 Institut de Química, 87
- internal exile, xii
 liberal free trade, 49
 liberal shelter, 210–12
 marginalisation, 109–10
 nuclear power, 176
 science journalist, 160
 technical chemistry, 49
 Mathematical Institute (Oxford), 160
 Matignon, Camille, 48, 67, 70
 Max-Planck Institute for Photochemistry,
 232, 235
 Max-Planck Society, 158, 179–80
 McAdams, William, 151
 medical chemistry, 72, 105, 136
 medicine
 and chemistry, 5, 11
 chemistry applied to, 38
 faculties, 22, 25, 39, 72, 201
 history of, 191
 laboratories, 200
 Nobel Prize, 20, 24, 171
 memory, 16
 and history, 218. *See* History and memory
 exile, 18, 213
 university in exile. *See* Francisco Giral
 metals, 20, 31, 89, 121, 136, 139, 143
 Mexico, xii, xiii, xvii, 191, 196–7, 199,
 200–1, 213
 Antonio Madinaveitia, 197
 editorial Atlante, 224
 exile, 100–1, 192–200
 Francisco Giral, 202, 228
 María Teresa Toral, 196
 Modesto Bargalló, 196
 natural products, xii
 Meyer, Kurt, 157
 Meyer, Richard, 180
 Milan, 31, 47, 78, 140
 militant history, 17
 mineral acids, 76, 121
 minerals, 20, 49, 77
 mining, 46, 78, 136, 139, 143, 197,
 202, 225
 modernisation, 14, 16, 24, 28, 35, 39, 50,
 52, 54–6, 73, 117, 182, 217, 226
 and Krausism, 53
 chemical industry, 186
 economic, 164–5, 168
 JAE project, 33
 laboratories, 36, 232
 material culture, 50
 non-democratic, 15
 paradoxes, 221–3
 rhetoric, 33, 187, 217
 technocratic, 172

278 Index

- modernisation (cont.)
 theories, 166
 university, 210
- modernity, 14, 23, 25, 40, 50, 54, 221, 234
 against backwardness, 50
 alternative, 9
 and Catalanism, 203
 and the INFQ, 56
 and the FNICER, 78
 conservative, 127, 130
 economic, 169
 industrial chemistry, 40
 laboratories, 50
 reactionary, 133–4
 Republican, 16
 rhetoric, 221
- molecular biology, xv, 11
- Moles, Enrique, xvii, 20, 32, 39, 67,
 110, 222
 and Ángel Vián, 101
 and Augusto Pérez Vitoria, 212
 and José Agell, 42
 and Lora-Tamayo, 222
 and the INFQ, 56, 65, 97
 and the RSEFQ, 39
 as chemist–historian, 55
 as Republican chemist, 54, 65
 atomic weights, 16, 34, 38, 118, 220
 chemical education, 49
 chemical weapons, 86, 92
 commemorative practices, xvii, 229
 exile, 99, 195
 Ibys, 206
 IUPAC Conference, 32
 laboratories, 36
 moral ambiguity, 216
 physical chemistry, 58–9, 61–2, 103, 225
 pure–applied chemistry, 42, 48–9,
 78, 219
 repression, 109
 school, 36, 61, 63, 101, 150–1, 196
 war weapons, 217
- Monterrey, 196
- Monsanto (chemical company), 183, 185
 moral ambiguity of chemistry, 16, 216–31
- Morocco, 76, 84
- Moscow, 52–3
- Movimiento Nacional*, 106, 125, 142
- Mulhouse, 41
- multiplets, 30, 57, 62, 106, 111. *See* Catalán
- Munich, 12, 29–31, 57, 104, 168, 179
- Muñoz del Castillo, José, 24
- Muñoz, Eugenio, 199–200
- Murcia, 144, 152
 University, 213
- Mussolini, Benito, 3, 54, 90–1, 120, 135,
 139–40, 164, 226
- mustard gas (yperrite), 84–5, 87, 90, 206
- National Catholicism, 116, 126, 130,
 135, 232
- National Socialism, 4, 188, 190
- nationalism, 55, 96, 125, 131, 136–7,
 165, 228
 and anti-liberalism, 137
 and totalitarianism, 125
 autarchic, 136
 Primo de Rivera, 55
 Spanish, 96, 120, 131, 165, 228
 Catalan, 23, 105, 203–4, 225
- Natta, Giulio, 140
- natural theology, 134, 141
- Navy
 Minister, 52, 85. *See* José Giral
- Nazi
 areligious worldview, 133
 army, 142
 collaboration, 142–3, 156
 concentration camps, xv
 experts, 164
 mass extermination, 167
 occupation, 107
 party, 84, 179
 policies, 167, 179
 regime, xv, 156, 162, 187
 science, 3
 terror, 99
 war criminals, 190
- Nazi Germany, 3, 54, 83, 91, 100, 108, 138,
 147, 155, 162–3
- Negrin, Juan, 100
- neo-salvarsan, 77
- neo-scholasticism, 115
- Nernst, Walther, 12
- networks, 13
 European, 25
 international, xiv, 28, 54, 71, 181, 221,
 225–6
 professional, 4
 religious, 82, 130, 225
- neutral expertise, 167–74. *See* Lora-Tamayo
- neutrality, 10, 16, 33, 84–5, 99, 135, 157,
 165, 167, 170, 173, 227
- New York, 29, 34, 46, 159, 198
- Nobel Prize winner, 1, 8, 20, 24, 30–1, 49,
 100, 139, 157, 171, 179, 190, 199,
 217, 232
- Nogareda, Carlos, 145
- nomenclature (chemical), 2, 42, 50, 71,
 128, 160

- nopal gum, 198
 North American Committee for Help to Democratic Spain, 100
 Novellas, Francesc, 43
 nuclear magnetic resonance, 11, 176
 Nye, Mary Jo, 5, 51
- Observatorio del Ebro*, 44
 Ochoa, Severo, 171, 229
 oil crisis, 215
 Opus Dei, xi, 15, 113, 126, 128–30, 133–4, 166, 168, 172–3, 191, 225. *See* Albareda
 Oreskes, Naomi, 17
Orfeo Català de Mèxic, 200
 organic chemistry, xi–xii, 20, 27, 30, 98, 105, 115–17, 122
 Barcelona, 50
 chair. *See* Giral. Pascual, Lora-Tamayo
 Colombia. *See* García Banús
 courses, 22
 industrial, 150. *See* José Prats
 INFQ, 79, 197
Instituto Nacional de Física y Química (INFQ). *See* Madinaveitia
 IQS, 233
 laboratories, 34–5, 37, 59, 64
Laboratorio de Química Orgánica. *See* García Banús
 Leuven/Louvain, 44
 Mexico, 198–9
 natural products, 132
 plant pigments, 24
 reaction mechanisms, 160
 school, 174, 176, 186, 225. *See* Lora-Tamayo, Calvet, García Banús
 section, 70, 170
 synthesis, 29
 textbooks, 46, 194
 Zurich, 31, 57, 232
- Organisation for Economic Co-operation and Development, 165
 Orozco, Fernando, 197, 199
 Ostwald, Karl Wilhelm Wolfgang, 32
 Ostwald, Wilhelm, 12, 29
 Physical Chemistry Institute (Leipzig), 46, 57, 62
 school, 80
 Othmer, Donald, 152
 Oviedo, 231
 chemical industry, 72
 Civil War, 92
 Emilio Jimeno and Franco, 118
 research institute, 64
 science faculty, 72
 University, 46, 78–9
 Oxford, xviii, 29, 105
 F. D. Chattaway, 29
 Isaiah Berlin, 189
 José Ignacio Fernández, 160
 Robert Robinson, 58, 157
- Palacio de la Química*, Barcelona, 33, 47, 217
 Palacios, Julio, 57
 X rays, 61
 Pallmann, Hans, 156
 Palmer, Brian, 8
 Palomares (atomic bombs), 174
 Paneth, Friedrich, 101
 Paris, 29–30, 38, 70, 98, 109, 160
 exile, 98–9, 107, 109, 195, 213
 Pasteur Institute, 12, 29–30
 Sorbonne, 24, 29, 178
 UNESCO, 213
 Parravano, Nicola, 67, 71, 139
 Pascual, José, xvii, 15, 30, 89, 95, 115, 134, 171, 210, 224–5
 and Enrique Moles, 222
 and Lora-Tamayo, 126, 170
 and the LQO, 90
 applied chemistry, 170, 220
 commemorative practices, xvii, 170
 European journey, 157–8
 industrial chemistry, 171
 international network, 221
 IUPAC, 160
 memory, 229
 school, 115, 176, 178, 186, 220, 225
 technocracy, 171, 174, 181, 187, 228
 Pasteur Institute, 12, 29–30
Patronato Alfonso X el Sabio, 113
Patronato Juan de la Cierva, 113, 135–6, 178, 229
Patronato Instituto Químico de Sarriá, 145–6
 Pauling, Linus, xv, 160, 196, 217
 peace, 14, 65, 71, 102
 25 years of, 170, 185
 ‘atoms for peace’, 176
 pellagra, 100
 Pellicer, José, 145
pensionados, 16, 28–33, 35, 39, 73, 76, 95, 155, 157, 226, 235. *See* JAE
 Pérez Alvarez-Osorio, Rafael, 157
 Pérez del Pulgar, José Agustín, 134
 Pérez Vitoria, Augusto, 67, 97, 103
 chair, 213
 exile, 195
 UNESCO, 213
 perfumes, 31, 47, 72, 76–7, 102
 Perrin, Jean, 31

280 Index

- personal perfection, 128, 133
 Pertierra, José Manuel, 78
 Pestre, Dominique, 11
 petrochemical(s)
 complex, 183, 185, 217
 industry, 5, 147, 182, 186
 Peypoch, Ramon, 90, 204
 pharmaceutical
 chemistry, 206
 entrepreneurs, 44, 146
 industry, 11, 98, 128, 150, 204, 207, 230
 laboratories, 44, 78, 196, 199
 pharmaceuticals, 11, 47, 76, 89, 136, 149,
 154, 182, 185, 194, 204, 206, 209
 pharmacy, 5, 11, 42–3, 48, 52, 63, 200
 chemistry applied to, 43
 degree, 112, 200
 faculties, 22, 25, 30, 58, 64, 71–2, 74, 98,
 101, 128–9, 229
Pharmazeutisches Institut (Dahlem), 200
 Philippines, 22, 120
 phosgene, 85, 87, 90, 92
 photochemistry, 232–3
 photography, 62, 109, 142
 physical chemistry, 15, 24, 32, 38, 43, 46,
 57, 62, 64, 70, 106, 113, 115–16, 127,
 129, 143, 146, 150, 160, 180, 216, 225
 at the LIF, 34
 chair, 87, 128, 145, 150
 laboratories, 59
 Moles, 106
 Moles' school, 36, 38, 61, 150, 196
 Ostwald's school, 80
 Rocadolano Institute, 144
 physiological chemistry, 22, 34
 Pi Sunyer, August, 200, 206
 Pictet, Amé, 31
 Pietsch, Erich, 180–1
 pigments, 24, 29, 44
 Pi-Sunyer Bayo, César, 200
 Pitaluga, Gustavo, 206
 Pius XII, 127
 Planell, Joaquín, 147, 171
 plastics, xv, 11, 113, 136, 144, 149, 164,
 182–6, 216
 Centro Español de Plásticos, Barcelona, 144
 pluralism, 189–90, 210
Polémica de la Ciencia Española, 28
Politecnico di Milano, 31
 popular chemistry, 43, 52, 122
 Popular Front, 193
 Porcioles, José María, 170
 Portugal, 5, 9
 Prats, José, 24, 41
 Prelog, Vladimir, 157, 233
 Presas, Albert, 8
 presentism
 motivational, 17
 new, 17
 Preston, Paul, 17
 Prieto, Carlos, 196
 Primo de Rivera's dictatorship, 2, 4, 7, 10,
 13–14, 16, 25, 33, 44, 46, 50, 52, 55,
 84, 92, 107, 190, 203, 217, 221
 Prison Notebooks
 Antonio Gramsci, 227
 Proctor, Robert, 3, 10
 professional 'calling', 168
profesor agregado, 173
 Public Instruction
 Minister, 57, 68
 Public Works
 Minister, 14, 142, 231
 Puertollano, 72, 147, 182–3, 185
 pure–applied
 chemistry, 42, 48, 120, 186, 218–21
 dichotomy, 41
 Putnam, Robert, 163
 pyrites, 76, 143, 147
 quantum chemistry, 11, 62, 160, 199
 radiochemistry, 160
 Raman spectrum, 70
 Ramón y Cajal, Santiago, 20, 24, 229
 Ramoneda, Josep, 18
 Ramsay, William, 29, 48
 fellowship, 99
 Rancaño, Adolfo, 62, 87
 raw materials, 15, 73–7, 81, 89, 121, 125,
 134–5, 138–9, 142–3, 147, 151, 186,
 207, 211, 213
 analysis, 89, 162
 and God's providence, 131
 control of, 216
 foreign, 154
 geography, 138
 geopolitics, 217
 in autarchy, 220
 in exile, 111
 local, 120, 138, 202
 national, 121, 138, 144, 162
 pyrite ores, 77
 restrictions, 111
 Rawls, John, 214
 reaction mechanisms, 157, 160
 reactionary modernism, 133. *See* Jeffrey
 Herf
*Real Academia de Ciencias Exactas, Físicas y
 Naturales*, Madrid, 27, 55

- Real Academia Nacional de Farmacia*, Madrid, 230
- Real Academia Sevillana de Ciencias*, 230
- Reial Acadèmia de Ciències i Arts de Barcelona*, xviii, 170
- Real Sociedad Española de Física y Química*. See RSEFQ
- refining, 142, 182
- refugees, 201–2
from Nazism, 99
in Mexico, 199
internal, 16, 192, 203–13
political, 191
- regenerationist movement, 23
- Reid, John T., 176
- religion and chemistry, 126–34
- REPENSA refinery, 182
- Reppe, Walter, 142
- repression, xviii, 14, 17–18, 84, 93, 97, 99, 100–1, 103, 106, 108, 117, 123, 125, 138, 155, 166, 168, 187, 194, 196, 203, 207, 209–10, 222–3, 229
academic, 93
internal, 223
police, 209–10
political, 123, 168
scientific, xviii
- republic of chemistry, 29
- Republican
army, 85–6, 95
cause, 17, 90
chemistry, 54, 61, 73, 81, 95, 225
chemists, 14, 193
culture, 16, 20, 53, 105
dream, 16, 54, 67, 81–2, 225
elites, 192
exile, 214
government, 56, 65, 79, 97, 100–3, 107–8, 145, 193, 199
government in exile, 13
opposition to Primo de Rivera, 52
order, 14
parliament, 64
parties, 225
policies, 62, 78–9, 95
political thought, 53
positivism, 81
regime, 7, 84
science, 134, 225
university, 228. See Francisco Giral
values, 79, 103, 116, 193, 195, 200, 204, 213
- republicanism, 14, 54, 65
- research school
- Residencia de Estudiantes*, xviii, 34, 68
- Ribas, Ignacio, 58, 66–7, 98, 110, 115, 214
and Antonio Madinaveitia, 79, 98
Zeltia, 207
- Richards, Theodore, 32
- Rideal, Eric K., 145
- Rif War, 84
- Riotinto, 142, 185
- Rius de la Pola, Pilar, 199
- Rius Miró, Antonio, 15, 95, 101, 103, 113, 161
and Albareda, 150
and Fernández-Ladreda, 159
and González Barredo, 129
and José Pascual, 134
books to the Caudillo, 156
chemical engineering, 151, 154
electrochemistry, 160
physical chemistry, 225
school, 115
technical chemistry, 150
- rivalry
among nations, 26
Jesuits–Opus Dei, 130
US–Soviet, 161
- Robinson, Robert, 29, 58, 71, 105, 157, 207
- Roca-Rosell, Antoni, 8
- Rocasolano, Antonio de Gregorio, 14, 31, 49, 92, 110, 113, 118, 129, 227
Acción Española, 96
against the JAE, 95–6, 110
and Albareda, 143
and Bermejo, 118
and Franco, 97
death, 128
Instituto, 159, 229
school, 38–40, 92, 113, 150, 221
- Roche, Jean, 179
- Rockefeller (The), 57, 61, 96, 102, 106, 118. See INFQ
- Rockefeller Foundation, 33, 56, 107, 198
- International Education Board (IEB), 56
- Rodríguez Mourelo, José, 32
- Rodríguez-Hahn, Lidia, 199
- Rome, 128, 139–40
- Romero, Ana, 8
- Romo, Jesús, 198
- Roosevelt, Theodore, 100
- Roqué, Xavier, 8–9
- Roquero, César, 196
- Rosenkranz, George, 198
- RSEFQ, 13, 23, 39, 48, 50, 103, 115, 150, 159–60, 222, 224
- rubber, 66, 143, 182, 184
natural, 198
synthetic, 136–7, 142, 167

282 Index

- Ruiz Giménez, Joaquin, 209
 Russell, Colin A.
 chemist–historians, 6
 Russia, 5, 52
 Rutherford, Ernst, 48
 Ruzicka, Leopold, 157, 232–3
- Sabatier, Paul, 29, 31, 46, 48–9
 Sabiñánigo, 72, 91
 Saeta (publisher), 129
 Sainz Rodríguez, Pedro, 107, 112
 Salamanca
 industrial chemistry, 151
 organic chemistry, 98
 Science Faculty, 72
 Universidad Pontificia, 173
 University, xiii, 20–2, 145, 209, 228
 university laboratories, 79
 war weapons, 92
 Salazar dictatorship, 164
 Samaranch, Juan Antonio, 145
 Sánchez Ron, José Manuel, 8, 106
 Sánchez-Bella, Florencio, 128
 Sandoval, Alberto, 199
 Sandoz (pharmaceutical company), 176, 183
 Santander, 72, 86, 185
 Aula de Cultura Científica, 213
 Chemistry Week, 159
 Summer School, 66–7, 72
 Santesmases, María Jesús, 8
 Santiago (de Compostela)
 Pharmacy Faculty, 72
 University, 93, 105
 university laboratories, 79
 Santos, Ángel, 128–9
 Santos, Eduardo, 200
 Sanz, Manuel, 132
 Saraiva, Tiago, 9, 137
 Schaffner, Kurt, 232
 Scherrer, Paul, 57
 Schlenk, Wilhelm, 194
 Schmidlin, Julius, 41
 School of Physiology (Barcelona), 200
 science policies, xiii, 8, 78, 108, 112, 126,
 158, 194, 229–30
 science popularisation
 as shelter, 203
 Miguel Masriera, 110, 210, 212
 UNESCO Conference, Madrid, 161
 science-based industry, 41, 49, 73, 80, 142,
 154, 218
 second Industrial Revolution, 10
 Second World War, 52, 109, 156, 158–9,
 162–4, 167, 189–90, 217, 220–1
 German defeat, 149
 Nazi Germany, 83, 142, 147
 totalitarianism. *See* Hannah Arendt
 secular
 chemists, 45
 education, 53, 81, 95
 science, 54
 secularism, 14, 96–7, 116, 130–1
 selection committees (*oposiciones*), 95
 self-sufficiency, 15, 140, 154, 163–7, 204.
 See autarky, autarchy
Servicio de Pólvoras y Explosivos, 86
 Seville, 39, 55, 136, 144, 179, 230
 Academy of Science, 230
 Instituto de Química, 64
 Lora-Tamayo and Pascual, 115, 157
 Military hospital, 90
 repression, 117
 Science Faculty, 72
 University, 30, 93, 115, 136, 157
 Shell (chemical company), 183–4
 shelter, 126, 212–13
 academic, 98, 214
 chemical, 214
 gas, 85
 in exile, 202
 industrial, 192, 203–4, 214
 laboratory, 90
 liberal, 203, 210
 Silver Age, 28, 42, 82, 116, 156, 191, 202,
 214, 223, 232
 chemists, 23, 57, 95–6, 102–3, 153,
 161, 194
 industrial, 219, 225
 of Spanish culture, 21
 of Spanish Science, 21
Sindicato Español Universitario (SEU),
 115, 123
Sindicato Nacional de Industrias Químicas,
 121, 123–4, 146, 206
 Skłodowska-Curie, Marie, 65
 socialism, 3, 53, 192, 196, 206, 221
 and communism, 86
 Antonio Madinaveitia, 61, 81, 227
Société de chimie industrielle, 44, 48
 Society for the Protection of Science and
 Learning. *See* SPSL
 Society of Jesus, 15, 44, 79, 102, 126, 130,
 133–4, 178, 225, 227
 soil chemistry, xi, 112, 127–8, 143, 156,
 179, 220, 225, 227
 Sommerfeld, Arnold, 57, 62
 Sorbonne, 12, 24, 29, 109, 178
 Sorolla, Joaquín, 98
 Soviet
 Academy of Sciences, 160

- science, 52–3, 168
 US rivalry, 161
 Soviet Union, 108, 199
 spectroscopy, 11, 15, 30, 34, 57, 59, 103,
 106, 109–10, 160, 176, 220
 chair, 106
 INFQ, 62, 100
 quantum chemistry applied to, 62
 Speer, Albert, 164
 SPSL, xviii, 98–9, 105
 stabilisation plan, 165, 182
 Staudinger, Hermann, 29, 31, 36, 58, 66,
 160, 206, 233
 steel, 87, 122, 136, 143, 149, 182
 steroids, xviii, 68, 129, 157, 179, 195,
 198–9, 220, 232–4
 Stockholm, 105, 160
 Stolzenberg, Hugo, 84
 student protests, 174, 209
 Suanzes, Juan Antonio, 122, 137, 181–2
 summer school, 224
 Béjar, 145
 Santander, 72
 Sureda, José, 31
 surface chemistry, 176
 Sweden, 5
 Syntex, 195, 198
 synthetic
 dyestuffs, 24
 fibres, 147, 164
 fuel, 77, 147
 gasoline, 143
 molecules, 216
 organic chemistry, 29
 perfumes, 47
 products, 44, 143, 182, 217
 rubber, 136–7, 142, 167
 sulphonamides, 77

 Tarragona, 183
 macrochemical industry, 185
 polo químico, 186
 Taylorism, 163
 teargas, 90
 technical chemistry, 49, 64, 78, 105, 113,
 120, 138, 149–51, 153, 225
 chair, 212
 technocracy, xv, 1, 10, 14–15, 165–6, 169,
 174, 187–8, 214, 216, 228
 and corporations, 183
 and José Pascual, 174, 187
 and López Rodó, 166
 and Lora-Tamayo, 166–7, 181,
 187
 terpenes, 16, 200, 232

 tetraethyl lead, 87
 theology, 45
 Tiselius, Arne, 160
 Todd, Alexander, 157, 160
 Todt, Fritz, 164
 Toral, María Teresa, 100–1, 196, 200
 totalitarian chemistry, 15, 122–3, 126
 totalitarianism, xii, xiii, xvi, 1, 2, 10, 14, 83,
 98, 115, 125, 134, 138, 156, 161, 164,
 166, 191, 204, 210, 223–4, 227
 and Albareda, 126, 129
 and Bermejo, 118
 and chemical engineering, 151
 and Emilio Jimeno, 118, 121
 and Gumersindo García, 123
 and Ibáñez Martín, 116
 and Opus Dei, 126–7, 129
 and the CSIC, 112
 autarchy, 186
 liberal opposition to, 189
 resistance to, 16
 Toulouse, 29, 46, 49, 130
 Trade and Industry
 Minister, 68, 142
Tribunal de Orden Público, 170
 Trowbridge, Augustus, 56

 Uthoff, José, 27, 203
 UNAM, 196–200
 UNESCO, 161, 213
 Union Carbide (chemical company),
 80, 183
*Unión de Profesores Universitarios Españoles en
 el Extranjero*, 193
 unit operations, 138, 151, 153–4, 218. *See*
 chemical engineering
 United States, 5, 12, 36, 46, 68, 99–100,
 128, 137, 149, 151, 162, 164, 168,
 172, 175, 197, 199
Universidad Nacional Autónoma de México.
 See UNAM
Universidad Central de Venezuela, 201
Universidad de Navarra, xviii, 173
Universidad Internacional de Verano,
 Santander, 66
 university, xiv, 33, 35, 43, 46, 49, 64, 87,
 98, 105, 107, 115–16, 118, 123, 129,
 136, 138, 150, 153, 170–6, 179,
 209–10, 212, 214, 220, 224, 226,
 228–30, 233–4
 and industry, 219
 buildings, 36
 Catalan system, 96
 chairs, 8, 16, 61, 65, 93, 106, 130, 213
 chemists, 152

284 Index

- university (cont.)
 crisis, 210, 214
 culture, 48
 departments, 29, 39
 faculties, 217
 institutes, 65
 laboratories, 79
 professors, xiv, 154
 rectors, 14, 64, 93, 115, 180
 reforms, 14, 22, 61, 172
 research, 49, 65
 research institutes, 64, 81
 sites, 153
 Spanish system, 43, 48
 students, 172
 system, 53, 64
 undergraduates, 30
 upheavals, 187
 Urbain, Georges, 24, 29–30
 and León Le Boucher, 94
 Urey, Harold C., 100
 Urgoiti, Nicolás María, 204
 US Department of State, 152
 USSR, 36, 52
 Utrecht, 157
- Valencia, 55, 79, 98, 107, 136, 144
 customs laboratory, 95. *See* Le Boucher
 Republican government, 98, 103
 Science Faculty, 72
 University, 45, 160
 Valley of the Fallen, 165
 Valls Taberner, José, 145
 Vián, Ángel, 14, 101, 153, 174
 and Enrique Moles, 101
 chemical engineering, 151
 industrial chemistry, 151, 174
 Vichy government, 107
 vitamins, 61, 68, 129, 157, 206–7, 209
 Vitoria, Eduardo, 24, 44, 79, 81–2, 129,
 132, 227
 and God's providence, 131
 and Paul Sabatier, 46
 and the Civil War, 102
 and the Society of Jesus, 126
 Catholicism, 210
 Jesuit chemistry, 45
 natural theology, 131–3, 141
 school. *See* IQS
 textbooks, 45–6
 Volterra, Vito, 139
 von Bayer, Adolf, 29
 von Euler, Hans, 67, 105
 von Papen, Franz, 179
- Vonnegut, Kurt, 1, 165
- Walden, Paul, 71
 Walker, Mark, 3, 17
 fellow travellers, 187
 Walker, William, 151
 Wall Street Crash, 68, 137, 163
 Warfare Service, 206
 War. *See* First World War, Second World
 War, Civil War, Cold War.
 Washington, DC, 29, 147
 Bureau of Standards, 40, 46, 128
 IUPAC Conference, 32, 222
 Watson, James, xv
 Weber, Max, 127, 168
 Weiss, Pierre, 57
 Werner, Alfred, 233. *See* coordination
 chemistry
 Wieland, Heinrich, 29–30, 105
 and Calvet, 104
 and García Banús, 35
 and Sureda, 31
 Willstätter, Richard, 24, 29, 57, 66–7,
 105
 and Antonio Madinaveitia, 57, 61
 and José Prats, 41
 and the INFQ, 56
 and the Republican government, 65
 and the Spanish liberal chemists, 29,
 57
 Wilson, Christopher L., 99
 Wise, Norton, 137
 Wohlsteiner, Albert, 168
 wolfram, 142
 Woodward, Robert F., 177
- X-rays, 11, 61, 176
- Yoldi, Jesús, 14, 93–4, 110. *See* Granada
- Zaragoza
 Industrial Engineering School, 150
Instituto de Química, 64
 Science Faculty, 72
 University, 32, 38, 92, 96, 113, 118,
 128, 209
 university laboratories, 79
 Zeeman, Pieter, 24
 Zeltia, 207
 Zhdanov, Yuri, 160
 Zurich, 29, 31, 35, 41, 58, 206,
 232
 ETH, 12, 29, 32, 35, 41, 50, 57, 156–7,
 232–3