

General Index

- Acid markets, 202-203
- Acid plants, 20, 163-166, 196
- Acquired Immune Deficiency Syndrome (AIDS), 20, 75, 205
- Advertising, 32-33, 249
- Africa, 97, 99, 164
- Air quality
 - Control costs, 20, 31, 168-170
 - Controls, 20, 31, 156-157, 163-168
 - Impacts, 162-163
 - Regulation, 27, 163, 206, 238, 241-242
- Alaska, 49, 98
- Albania, 85
- Alcan, 252
- Alcoa, 252
- Aluminum, 9, 11, 32, 59-60, 79, 91, 250, 252-253
- American Mining Congress, 32
- American Society of Mechanical Engineers, 32
- Amoco, 5, 50, 207, 226, 246-247
- Anaconda Minerals, 5, 48, 49, 50, 52, 113, 163, 226, 242, 246-248
- Angola, 205, 235
- Arco Corporation, 50, 246-247, 252
- Argentina, 92
- Arizona, 12, 29, 40, 47, 48-50, 67, 69, 97, 133, 175, 179, 239, 243
 - Ajo, 49, 113, 166
 - Bisbee, 48, 49, 74, 109, 112, 193
 - Casa Grande, 126
 - Claypool, 50
 - Clifton/Morenci, 49, 112
 - Douglas, 13
 - Globe, 48-49, 113
 - Miami, 113
- Arizona Copper Company, 49
- Asarco, 5, 41, 42, 49, 50, 52, 163, 179, 202, 206, 212, 233, 246-247
- Australia, 19, 39, 67, 70, 74, 92, 97, 197-201, 204, 206-207, 213-214, 215, 218
- Automated controls, 19-20, 41
- Automobile industry, 33, 76, 79, 251
- Belgium, 70, 78, 83, 209, 213-214
- BP Minerals America, 40, 50, 66, 202
- British Metal Corp., 209
- Brass mills, 27, 78
- Brazil, 70, 74, 210
- Broken Hill Proprietary, 207
- Bulgaria, 85
- Byproducts and co-products, 7, 92-94, 99, 202, 210-211
 - Arsenic, 162-163
 - Bismuth, 94
 - Cadmium, 94
 - Cobalt, 94, 210
 - Costs, 187
 - Elemental sulfur, 165
 - Gold, 92-94
 - Gypsum, 163
 - Iron, 94
 - Lead, 94
 - Liquid sulfur dioxide, 165
 - Molybdenum, 92-94
 - Nickel, 94
 - Silver, 92
 - Sulfuric acid, 20, 31, 81, 161-170, 196
 - Zinc, 94
- Calumet & Arizona Mining Company, 49
- Canada, 13, 20, 25, 26, 31, 39, 65, 67, 68, 70, 73-74, 82, 83, 92, 170, 197-201, 203-204, 210, 213-215, 217-218, 233-234
- Capacity, 65-66, 188-189, 210, 216
 - Mine, 5, 39, 47, 53-54, 58, 74
 - Smelter, 20, 69
 - Refinery, 70
- Capacity Utilization, 5, 19, 66
- Centromin Peru S. A., 52, 69
- Cerro, 206
- Chile, 13, 15, 17, 19, 20, 39, 47, 49, 51, 52, 53, 54, 64, 65, 67, 69, 70, 72, 74, 75, 78, 81, 82, 83, 84, 92, 97, 170, 193, 197-201, 204, 210, 213-218, 234
- CIPEC (Intergovernmental Council of Copper Exporting Countries), 19, 31, 39, 235
- Cities Service, 50, 246-247
- Clean Air Act, 81, 82, 163, 170, 238, 241
- Clean Water Act, 172, 238-239
- CODELCO, 17, 51, 52, 67, 199-201
- Coinage, 11, 27, 31, 246
- Colombia, 208
- Cominco, 204
- Committee on Materials, 243
- Commodity Exchange
 - Commodity Exchange of New York (COMEX), 54-56
 - London Metal Exchange (LME), 54-56
 - Pricing, 54-56
- Comparative advantage, 222-223
- Competitiveness, 15-16, 221-253
 - And staying power, 227-228
 - And technology, 16, 19-20, 226-227
 - Effects of environmental regulation, 240-242
 - Industry strategies, 246-253
 - Measures of, 221-228
- Comprehensive Environmental Response, Compensation and Liability Act (Superfund), 172, 239
- Congressional Budget Office, 25, 229-230
- Congressional Copper Caucus, 6
- Construction industry, 10, 58, 76-77
- Consumer goods, 10, 76-77
- Consumption, 13, 16-19, 39-41, 63-65, 76-78
- Converting, 135-137, 167-168
- Copper
 - Anode, 7
 - As a byproduct, 11, 65, 67, 97-98, 99, 201
 - Blister, 7
 - Cathode, 7

- Concentrate, 7
- Fabricated and semi-fabricated products, 78
- Matte, 7
- Properties, 5, 9, 60, 76-77
- Quality, 32, 60
- Refined products, 7
- Scrap, 11, 69, 70, 78
- Uses, 5, 10-11, 13, 76-77
- Copper Development Association, 79
- Copper Ore, 91-100, 186-188
 - Carbonates, 91
 - Cut-off grade, 41-42, 99-100, 153, 186
 - Grade, 6, 9, 15, 40-41, 47, 98-100, 186-187, 216
 - Massive sulfide deposits, 92
 - Oxides, 7, 15, 28, 58, 91
 - Porphyry deposits, 15, 49, 92, 112-113
 - Resources and reserves, 9, 15, 94-98
 - Silicates, 91
 - Strata-bound deposits, 92
 - Sulfides, 7, 15, 91-92
- Copper Producer/Consumer Forum, 31, 234-235
- Copper Range Company, 12-13, 50, 202, 212, 246-248
- Costs, 185-218, 225, 241
 - Capital, 45, 47, 48-49, 108-109, 169-170, 173, 192
 - Concepts and Definitions, 185-186, 197
 - Production, 15-16, 19, 41-42, 72-74, 185-218
- Crushing and grinding (comminution)
 - Costs, 127
 - Energy use, 154-155
 - Technology, 41, 127-129
- Cuba, 85
- Cyprus, 92
- Cyprus Minerals Company, 42, 50, 126, 202, 212-213, 226, 246-247
- Czechoslovakia, 85
- Defense policy, 25, 27, 235-237
- Defense Production Act, 27, 236-237
- Degussa, 209
- Demand growth, 16-19, 20, 23, 39-41, 58-59, 63-65, 76-80
- Detroit Copper Company, 49
- Diversification, 19
- Doe Run Co., 233
- Duval Corporation, 50, 231
- Education and training, 24, 29-31
- Electrical and electronics industry, 10, 58, 76-77, 79
- Electrorefining, 7, 70, 142, 157-158
- Electrowinning, 7, 70, 142-143, 157-158
- ENAMI, 52, 199
- Energy
 - Costs, 19, 67, 192, 204
 - Use, 41, 127, 151-158, 192
- Environmental regulation, 24-25, 31, 41, 47, 161-162, 202, 237-242
- Equipment vendors, 13
- Exchange rates, 19, 23, 31, 60, 64, 210-211
- Exploration
 - costs, 114
 - Technology, 113-115
- EXXON, 50
- Falconbridge, 197, 204
- Financing, 16, 52-54, 56-57, 192
- Finland, 65
- Fire refining, 70, 137
- Flotation (beneficiation)
 - costs, 131-133
 - Energy use, 154-155
 - Technology, 130-133
- Flue gas desulfurization, 166
- France, 78, 83
- Freeport McMoran, 208
- Fugitive emissions, 162, 167-168, 170
- Gecamines, 17, 52, 68
- General Accounting Office, 169
- General Agreement on Tariffs and Trade (GATT), 31, 231
- German D. R., 85
- Germany, F. R., 65, 70, 78, 80-81, 83, 84, 208-209, 213-214
- Gross national product (GNP), 5, 9, 58-59
- Health and safety, 41
- Hecla Mining Company, 126
- Highland Valley, 204
- Highmont Mining Corp., 204
- Hudson Bay Mining and Smelting Company, 50, 234
- Hungary, 85
- Hydrometallurgy, 7
 - Costs, 140, 196
 - Energy use, 157
 - Technology, 140-142
- In-pit crushing and conveying systems, 28-29, 41
- INCO, 197, 204
- India, 210
- Indonesia, 19, 39, 92, 94, 197-201, 207-208, 213-214, 215, 218
- Industrial machinery and equipment industry, 10, 76-77, 226, 249
- Industrial policy, 244-246
- Inflation, 210-211
- Infrastructure, 47, 193
- Inspiration Consolidated Copper Company, 42, 50, 113, 168, 202, 212, 247
- Interest rates, 16, 53, 64, 192
- Intergovernmental Council of Copper Exporting Countries (CIPEC), 19, 31, 39, 235
- International financing institutions, 19, 52-54, 192, 223, 242
 - Inter-American Development Bank, 53
 - International Monetary Fund, 31, 53, 54, 233
 - World Bank, 16, 53, 170, 241-242

- International Trade Commission, 231-233
 Inventories, 13-15, 16-19, 20, 23, 39-41, 53-54, 57, 63-65
 Investment risk, 45-47, 53, 186, 191
 Iran, 92, 210
 Iron precipitation, 7, 141
 Israel, 103
 Italy, 78, 83
- Japan, 20, 65, 70, 72, 78, 80-81, 83, 164, 170, 204, 208-209, 213-214, 234
- Kaiser, 252
 Kennecott Corporation, 5, 42, 49, 50, 66, 69, 212, 226, 246-247
 Kidd Creek, 204
 Korea D. P.R., 85
- Labor
 Numbers of employees, 12, 40
 Productivity, 6, 15, 28, 31, 40, 41, 67, 212
 Strikes, 16, 65, 68, 193, 212
 Wages and salaries, 6, 19, 41, 64-65, 67, 193, 203, 204, 212
- Leaching (solution mining), 7, 15, 28, 41, 58, 72-74, 99-100, 112, 118-119, 126, 157, 196
- Leadtimes, 45, 191
- Less-developed countries (LDCs), 15-16, 23, 25, 31, 39, 46, 47, 50-52, 52-54, 58, 63, 193, 204, 222-223
- Life span, 191
- Location, 192-193
- Louisiana Land & Exploration, 50, 246-248
- Lornex Mining Corp., 204
- Magma Copper, 42, 50, 69, 202, 226, 246-247
- Marine anti-fouling (bottom paint), 10, 79-80
- Market share, 15, 26, 223-224
- Marketing, 249
- Marmon Group, 52
- Melting and casting, 145-147
- Metallgesellschaft, 209
- Mexico, 17, 20, 49, 51, 52, 67, 74, 75, 92, 97, 170, 197-201, 204, 206, 213-214, 215, 218
- Miami Copper Company, 50
- Michigan, 13, 48, 67, 69, 97, 107
- Minerals policy, 242-243
- Minero Peru, 52, 65, 69
- Mining
 Costs, 116-118, 185-218
 Energy use, 152-153
 Open pit, 7, 118
 Plans, 41-42, 67, 75, 99
 solution, 7, 15, 28, 41, 58, 72-74, 99-100, 112, 118-119, 126, 157
 Technology, 41, 116-126
 Underground, 7, 118
- Mining and Excavation Research Institute, 32
- Mining and Mineral Policy Act of 1970, 27, 29
- Minnesota, 98
- Mitsubishi Corporation, 81
- Montana, 48, 50, 67, 97, 98, 107, 115
- Montana Resources Inc., 202, 212, 247-248
- Mozambique, 205, 235
- Namibia, 197, 199, 215
- National Bureau of Standards, 243
- National Cooperative Research Act of 1984, 32, 249
- National Defense Stockpile, 13-15, 27, 236-237
- National Environmental Policy Act (NEPA), 172, 237-238
- National Materials and Minerals Policy, Research and Development Act of 1980, 242-243
- National Strategic Materials and Minerals Program Advisory Committee, 243
- Nationalization, 17, 46-47, 52
- Nevada, 49, 50, 113
- Nevada Consolidated Company, 113
- New Mexico, 20, 47, 49, 67, 69, 74, 75, 97, 113
- Newmont Mining Company, 50, 52, 206, 207, 246-247
- Non-Ferrous Metals Producers Committee (NFMPC), 233-234
- Noranda, 50, 68, 126, 202, 234
- Norddeutsche Affinerie, 209
- North America, 39, 92, 97, 99
- Occidental Petroleum, 50
- Office of Technology Assessment, 6
- Oil companies, 50
- Oman, 210
- Ownership
 Changes in, 48-52, 58, 223-224
 Government, 50-52, 223-226, 228
- Pakistan, 92
- Papua New Guinea (PNG), 19, 39, 74, 81, 83, 92, 94, 98, 193, 197-201, 207-208, 213-214, 215, 218
- Pennzoil, 50
- People's Republic of China, 85, 92
- Peru, 13, 17, 19, 39, 47, 49, 52, 67, 69, 70, 74, 75, 83, 92, 97, 170, 193, 197-201, 204, 206, 210, 213-218
- Phelps Dodge Corporation, 5, 48-50, 52, 57, 66, 69, 74, 81, 82, 112, 113, 166, 202-203, 206, 212, 226, 233, 246-247, 253
- Philippines, 54, 67, 70, 81, 92, 94, 98, 197-201, 204, 207, 213-214, 215, 218
- Poland, 85
- Portugal, 74
- Price
 Byproducts, 64, 198, 210-211
 Copper, 5, 6, 11, 15, 16-20, 23-24, 39-42, 63-65, 185
 Structure, 54-60
- Production, 16-19, 39-41, 63-65, 224
 Capacity, 5, 65-66
 Mine, 5, 11, 20, 66-69
 Refinery, 11, 70-72
 Scale, 188-191
 Smelter, 11, 69-70, 82
- Profitability, 15, 20, 42, 185, 225-226
- Public profile, 193
- Pyrometallurgy, 7, 133-140, 155-157

- Refining, 7
Costs, 142, 185-218
Energy use, 157-158
Technology, 142-143
Relative purchasing power, 211-216
Research and development
Federally-funded, 29, 243-244
Corporate, 32, 248-252
Policy, 24, 29-31, 242-244
Resource Conservation and Recovery Act (RCRA), 172, 173, 239
Reynolds, 252
Rio Tinto Zinc, 207
Roan Consolidated Copper Mines Ltd.
Roasting, 134, 156
Romania, 85
- Safe Drinking Water Act, 172, 239
Shell Oil Company, so
Smelting
Costs, 133-134, 185-218
Energy use, 155-157
Pollution control, 20, 135, 156-157, 163-168, 238, 241
Technology, 20, 133-140
SOHIO, 50
Solid and liquid wastes (see water quality)
Solvent extraction-electrowinning (SX-EW), 7, 11, 19, 20, 25, 28, 41, 58, 72-74, 142, 157, 196, 226-227
South Africa, 70, 75, 92, 197-201, 207, 213-214, 215, 218, 205, 235
South America, 92, 95-97, 99, 164
South Korea, 70
Southern Peru Copper Company (SPCC), 52, 54, 69, 206
Spain, 65, 83
Steel industry, 33, 151, 251-252
Strategic materials, 13, 76-77
Stripping ratio, 41-42, 153, 187-188
Subsidization, 25, 26, 27, 47, 52-54, 192-193, 245
Substitution, 11, 32, 59-60, 64, 76, 79
Sumitomo Corporation, 57, 81, 208
Superconducting materials, 58, 80
Superior Oil, 50
Superfund (Comprehensive Environmental Response, Compensation and Liability Act), 172, 239
- Tanzania, 205
Tax
Policy, 25-27, 229-231
Rates, 230
Tax Reform Act of 1986, 229-230
Technological innovation, 26, 79-80, 115, 119, 128-129, 131-133, 137-139, 142, 143, 151
Technology transfer, 28-31, 227-228
Telecommunications, 76, 79
- Tennessee Copper, 50
Tintaya, 52, 69
Trade, 80-84
Anode, 83
Blister, 83
Exports, 12
Imports, 11, 13
Net import reliance, 11, 15, 82
Ores and concentrates, 83
Policy, 25-27, 231-235
Refined products, 84
Trade Act of 1974, 25, 231-232
Transportation
Costs, 19, 67, 153, 185
Industry, 10, 58, 76-77
- Union of Soviet Socialist Republics, 85
United Kingdom, 78, 83
United Nations Conference on Trade and Development (UNCTAD), 234-235
U.S.-Canada Free Trade Agreement, 25, 26, 233-234, 242
U.S. Department of Commerce, 234,
U.S. Department of Energy, 243
U.S. Department of the Interior
Bureau of Mines, 29, 51, 53, 64, 66, 85, 94-95, 118, 126, 188-189, 197-198, 209-218, 243
Geological Survey, 29, 94-95, 243
U.S. Environmental Protection Agency, 166, 168-169, 172-174, 177, 237-240, 244
Utah, 40, 69, 97, 98
Utah Copper Company, 112, 113
Utah International Corporation, 74
Utah Mines, 204
- Valley Copper Mines Ltd., 204
- Water quality, 170-179
Control costs, 172-173, 179
Controls, 174-179
Impacts, 170, 173-174
Regulation, 171-172
Weather, 47, 65, 192-193
- Yugoslavia, 19, 39
- Zaire, 13, 17, 19, 20, 39, 47, 52, 54, 65, 67, 68, 70, 75, 78, 83, 92, 94, 97, 98, 170, 193, 197-201, 204-206, 210, 213-215, 217-218, 235
Zambia, 13, 17, 19, 20, 39, 47, 51, 52, 54, 65, 67, 68-69, 70, 74, 75, 78, 84, 92, 94, 170, 193, 197-201, 204-206, 210, 213-218, 235
Zambia Consolidated Copper Mines Ltd. (ZCCM), 17, 51, 52, 68

Copper Properties Index

- Afton, 204
 Andina Mine, 192, 193, 199, 201
 Ansil property, 74
 Atlanta claim, 48, 49
 Atlas Mines, 207

 Bagdad Mine, 202
 Bell, 204
 Biga Mine (Atlas), 207
 Bingham Canyon Mine, 6, 40, 49, 50, 66, 67, 98, 112, 189, 191, 197, 202, 216
 Bougainvillea Mine, 92, 207
 Butte smelter, 163, 242

 Cananea Mine, 49, 51, 52, 74, 206
 Cananea smelter, 206
 Carmen Mine (Atlas), 207
 Casa Grande Mine, 126, 202
 Cerro de Pasco, 17, 49, 52
 Cerro Verde, 17, 52
 Chambishi Mine, 69
 Chino Mine, 49, 50, 69, 74, 81, 113, 191, 202, 208, 212
 Chino Smelter, 191
 Chuquicamata, 49, 74, 189, 195, 199, 201, 216, 222
 Cliff Mine, 107
 Continental Mine (East Berkeley Pit), 67, 202, 248
 Copper Cliff, 204
 Copper Flat Mine, 47, 192
 Copper Queen Mine, 49, 112
 Cuajone Mine, 192, 206

 Dikuluwe/Mashamba Mine, 204
 Douglas smelter, 13, 48-49, 50, 69, 112, 241

 Eisenhower Mine, 202
 El Paso smelter, 163, 202, 212
 El Salvador, 195, 199
 El Teniente, 49, 189, 195, 199
 Ertsberg Mine, 94, 208
 Esperanza Mine, 202

 Flin Flon smelter, 234

 Garfield smelter, 69
 Gaspé Mine, 234

 Hayden smelter, 202
 Hidalgo smelter, 202
 Highland Valley, 204
 Highmont, 68
 Home smelter, 68, 204

 Inspiration Mine, 191, 202
 Inspiration smelter, 202, 242

 Irish Mag Mine, 49
 Island Copper, 204

 Kamoto Mine, 204
 Kansanshi Mine, 69
 King Solomon's Mines, 103
 Konkola Mine, 69
 Kov Mine, 204

 La Caridad Mine, 17, 49, 51, 52, 192, 206
 La Escondida, 52, 74, 208, 216
 La Oroya smelter/refinery, 52
 Lakeshore Mine, 126, 202
 Lornex, 68, 192, 204
 Lutopan Mine (Atlas), 207

 Maria Mine, 74
 McGill smelter, 241
 Miami Mine, 48, 202
 Mina Sur, 201
 Mission Mine, 41, 202
 Morenci Mine, 57, 74, 81, 189, 202, 208, 212, 246
 Morenci smelter, 81
 Mount Isa Mine, 207
 Mufilira Mine, 205

 Nacozari smelter, 206
 Neves Corvo Mine, 74, 216
 New Cornelia Mine, 49, 212
 Nchanga Division Mines, 189, 205
 Nkana Division Mines, 205

 Ok Tedi Mine, 74, 94, 207, 216
 Old Dominion Mine, 48-49, 113
 Olympic Dam (Roxby Downs), 74, 216
 Ox Hide Mine, 202

 Palabora Mine, 207
 Pima Mine, 202
 Pinto Valley Mine, 50, 202
 Prieska Mine, 75

 Ray Mine, 49, 50, 113, 191, 202
 Rio Tinto, 103
 Rouyn smelter, 234
 Roxby Downs (Olympic), 216
 Ruttan Mine, 68, 204

 Salobo Mine, 74, 216
 San Manuel Mine, 133, 189, 202
 San Manuel smelter, 69, 202
 San Xavier Mine, 202
 Sar Cheshmeh, 192
 Sierrita Mine, 202, 212, 237
 Silver Bell Mine, 47, 192, 202
 Sipalay Mine, 207
 Sudbury (Falconbridge), 204

Tacoma smelter, 163, 241

Timmins, 204

Tintaya, 192

Toquepala Mine, 192, 206

Troy Mine, 202

Tyrone Mine, 20, 49, 50, 74, 75, 113, 192, 202, 212

United Verde Mine, 48

Valley Copper Mine, 68

White Pine Mine, 13, 50, 202, 248

White Pine smelter, 69, 166, 202