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KEY PUBLICATIONS

Minerals Yearbook—Annual publications that review the mineral industry of the United States and foreign countries. Contain statistical data on materials and minerals and include information on economic and technical trends and developments. The Yearbook is published in three volumes: Volume I, Metals and Minerals; Volume II, Area Reports, Domestic; and Volume III, Area Reports, International.

Mineral Commodity Summaries—Published on an annual basis, this report is the earliest Government publication to furnish estimates covering nonfuel mineral industry data. Data sheets contain information on the domestic industry structure, Government programs, tariffs, and 5-year salient statistics for over 90 individual minerals and materials.

Mineral Industry Surveys—Periodic statistical and economic reports designed to provide timely statistical data on production, distribution, stocks, and consumption of significant mineral commodities. The surveys are issued monthly, quarterly, or at other regular intervals, depending on the need for current data.

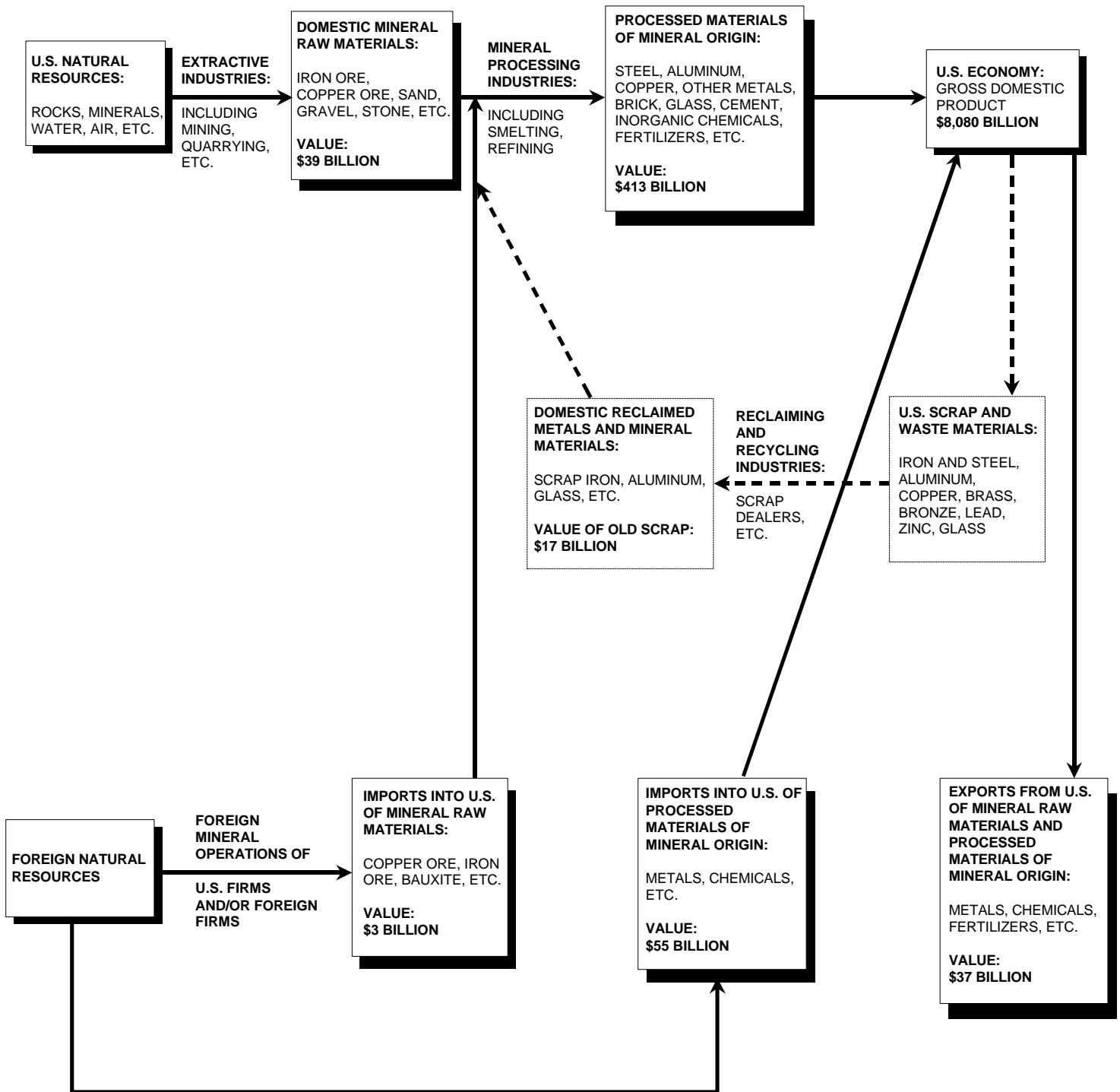
Metal Industry Indicators—A monthly publication that provides economic indicators of mineral activities.

WHERE TO OBTAIN PUBLICATIONS

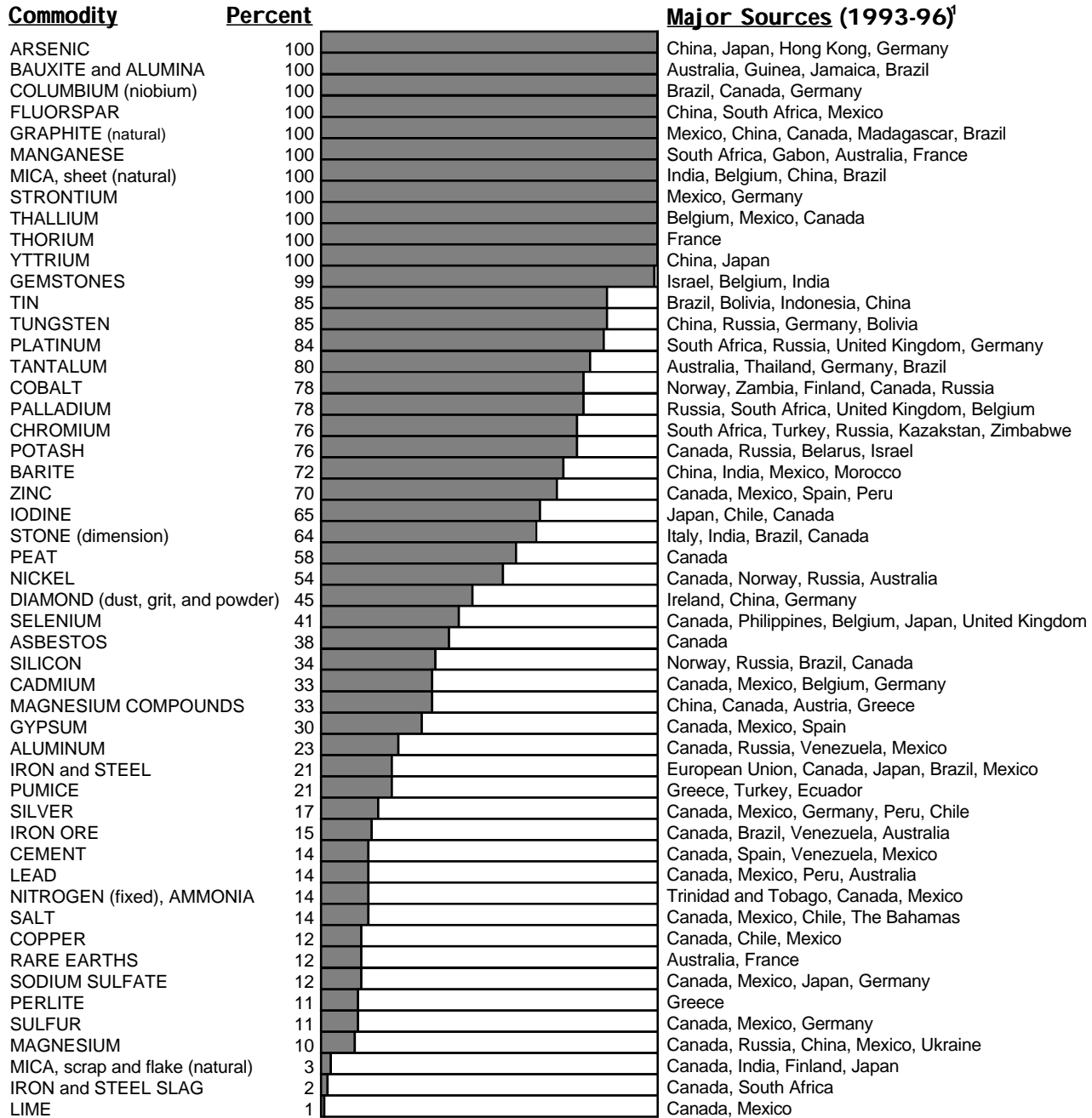
- *Mineral Commodity Summaries* and the *Minerals Yearbook* are sold by the U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954. To order by telephone, call (202) 512-1800.
- *Mineral Industry Surveys* and *Metal Industry Indicators* can be obtained free of charge by calling (412) 892-4338 or writing NIOSH Printing Office, Pittsburgh Research Laboratory, P.O. Box 18070, Pittsburgh, PA 15236.

THE ROLE OF NONFUEL MINERALS IN THE U.S. ECONOMY

(ESTIMATED VALUES IN 1997)



1997 U.S. NET IMPORT RELIANCE FOR SELECTED NONFUEL MINERAL MATERIALS



¹In descending order of importance

Additional commodities for which there is some import dependency but data are withheld or are insufficient to determine import-reliance levels:

Antimony	China, Mexico, Bolivia, South Africa	Mercury	Russia, Canada, Spain, Kyrgyzstan
Bismuth	Mexico, Belgium, China, United Kingdom, Canada	Rhenium	Chile, Germany, Netherlands, United Kingdom, Russia
Gallium	France, Russia, Canada, Germany, Hungary	Rutile	Australia, South Africa, Sierra Leone
Germanium	Russia, United Kingdom, China, Belgium, Ukraine	Titanium (sponge)	Russia, Japan, China, Kazakstan
Ilmenite	South Africa, Australia, Canada	Vanadium (ferrovanadium)	Russia, Canada, Belgium, Austria
Indium	Canada, Russia, France, Italy, China	Vermiculite	South Africa, China
Kyanite	South Africa	Zirconium	Australia, South Africa

SIGNIFICANT EVENTS, TRENDS, AND ISSUES

The Mineral Sector of the U.S. Economy

The U.S. economy and, consequently, the demand for minerals grew at a moderate rate in 1997. A low inflation rate, stable interest rates, and increases in employment bolstered consumer confidence throughout the year. The increase in employment resulted in increased taxes paid at both the Federal and State levels, which decreased the Federal deficit and resulted in positive balances for 49 of 50 States. The decrease in the Federal deficit and low inflation were seen as positive indicators that the economy would continue to expand in the coming year. Demand for metals was relatively stable or increased compared with that of 1996. Demand for most industrial minerals, especially crushed stone and cement, increased compared with that of the previous year. More detailed information on events, trends, and issues in the mineral and mineral products sectors is presented below and in the commodity sections that follow.

Overall Performance

The value of processed materials of mineral origin produced in the United States during 1997 was estimated to be \$413 billion, an increase of nearly 7% compared with the 1996 value. The estimated value of U.S. raw nonfuel minerals production in 1997 was nearly \$39.5 billion, an increase of about 2% compared with that of 1996. The nominal value of U.S. minerals production has increased in 31 of the last 37 years.

Total U.S. trade in raw minerals and processed materials of mineral origin was valued at \$95 billion in 1997. Imports of processed mineral materials were valued at an estimated \$55 billion, while exports of these materials were valued at an estimated \$37 billion. Imports of metal ores and concentrates and of raw industrial minerals increased almost 8% to \$2.8 billion. Raw minerals exports increased slightly to \$3.1 billion. Demand for metals and other mineral-based materials used extensively in motor vehicle manufacturing declined slightly in 1997 because of the estimated decline in automobile manufacture. The motor vehicle manufacturing sector is a major consumer of steel and other mineral-based materials, chiefly aluminum, copper, lead, platinum-group metals, zinc, glass, and plastics.

The domestic construction industry provided for modest growth in minerals demand. The construction sector is the largest consumer of brick clay, cement, sand and gravel, and stone. Road construction expenditures in 1997 maintained the high levels of the last few years as a result of the 6-year Federal highway and mass transit program reauthorized in 1991. Large quantities of asphalt, cement, crushed stone, and sand and gravel are used in road building. Apartment building construction and new home construction increased in 1997, which had a positive effect on the consumption of brick clay, cement, sand and gravel,

steel, and stone.

Responding to domestic and world demand for fertilizer nutrients, the domestic mineral fertilizer manufacturing sector again operated at nearly full capacity, which resulted in a strong demand for fixed nitrogen, phosphate rock, and sulfur. Global fertilizer nutrient consumption increased substantially; U.S. demand at the farm level, where fertilizers are consumed, increased in response to higher domestic and world demand for coarse grains and other high volume agricultural products.

The Uruguay Round of the General Agreements on Tariffs and Trade (GATT) became effective January 1, 1995. GATT rules, such as those that address market access affected by tariff and nontariff market barriers, are significant to U.S. minerals producers. For example, Uruguay Round GATT agreements eliminate tariffs (during a 10-year period) on steel imposed by the United States and its trading partners, including the European Union and Japan.

Legislation to reform the Mining Law of 1872 has been considered by the Congress and the Administration for the past several years; however, no reform legislation was enacted in 1997. The Mining Law gives U.S. citizens and corporations the right to prospect for certain minerals on particular Federal lands and confers the right to file claims that permit the claimants to mine and sell minerals found. The Mining Law does not provide for a royalty payment to the Federal Government for minerals that are mined. Under the Mining Law, claimants also may apply for a patent that transfers ownership of minerals and mineral lands to the claimant.

In fiscal year 1997, the Defense Logistics Agency sold excess mineral materials valued at \$513 million (see "Government Stockpile" in the commodity sections that follow). The Defense Production Act, which provides authority for priorities, allocations, and defense-related supply expansions, is expected to continue.

Outlook

The U.S. economy is expected to continue to grow at a moderate rate for the near term, providing a mild stimulus to the Nation's materials-consuming industries. Inflation is expected to remain low, thus permitting a continuance of low interest rates conducive to an expanding economy. Although motor vehicle sales have declined slightly from their 1994 peak, relatively strong sales are expected to continue because of moderate auto loan interest rates and advantageous monetary exchange rates. The Federal highway and mass transit program was expected to be reauthorized and continue to provide an impetus for consumption of stone, sand and gravel, and steel. The demand prospect for mineral fertilizer materials (i.e., fixed nitrogen, phosphate rock, potash, and sulfur) is expected

TABLE 1.—U.S. MINERAL INDUSTRY TRENDS

	<u>1993</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997^e</u>
Total mine production: ¹					
Metals	10,800	12,100	14,000	12,900	12,400
Industrial minerals	21,200	23,100	24,600	25,800	27,100
Coal	18,800	20,100	19,500	19,700	19,900
Employment: ²					
Coal mining	86	90	84	79	75
Metal mining	40	39	41	42	42
Industrial minerals, except fuels	76	78	80	81	82
Chemicals and allied products	573	578	580	575	568
Stone, clay, and glass products	399	411	418	421	423
Primary metal industries	520	537	553	554	556
Average weekly earnings of production workers: ³					
Coal mining	767	803	828	859	863
Metal mining	659	699	735	763	787
Industrial minerals, except fuels	585	610	624	648	679
Chemicals and allied products	639	654	675	699	717
Stone, clay, and glass products	506	526	534	555	568
Primary metal industries	611	641	643	662	682

^eEstimated.

¹Million dollars.

²Thousands of production workers.

³Dollars.

Sources: U.S. Geological Survey; U.S. Department of Energy, Energy Information Administration; U.S. Department of Labor, Bureau of Labor Statistics.

to be strong in the coming year because low world stocks of grains and oilseeds should stimulate increased planting domestically and worldwide.

Significant International Events¹

During 1997, the mining industries of most countries in both hemispheres were generally prosperous. By the end of the year, however, fundamental changes had overtaken global financial markets. Continued acceptance of foreign investment and privatization of formerly state-owned companies in much of the world had a salutary effect on production efficiencies, although the supply of investment capital appeared to be threatened as the year ended. Despite the long-anticipated investment upswing in Eurasia, particularly Kazakhstan and Russia, overextension of credit during the period of growth in several East and Southeast Asian countries led to bank failures or insolvencies, withdrawal of foreign capital, and damaging runs in currency markets. The resulting currency devaluations amounted to large-scale destruction of capital and led to loss of confidence and contraction of the equity markets that provide investment capital. Market contractions

engendered loss of confidence in other countries. Amidst plans for expansion of copper capacity, potential Asian demand for metals was seen to be threatened, with consequences for countries, such as Chile. The ripple effect spread to Mexico, Brazil, most of Latin America, and as far as London and South Africa. The United States and Japan, the world's two largest economies and major sources of capital for international mining ventures, were affected by market corrections that also diminished capital. By unfortunate coincidence, the price of gold steadily weakened throughout 1997. The central banks of several countries sold large shares of their gold holdings to meet common-currency criteria for the European Union (EU) or, as in Australia's case, simply to demonetize. Consequences, which have been serious, included closing or suspension of operations of many gold mines, as well as revision or cancellation of plans for gold exploration. The Bre-X Minerals Ltd. scandal in Indonesia added an additional burden on junior companies attempting to raise capital for gold exploration. The continuing commitment of many governments to privatize state-owned companies and acceptance of foreign investment for exploration and development may represent the essentially favorable news

TABLE 2.—U.S. MINERAL-RELATED ECONOMIC TRENDS

	<u>1993</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997^e</u>
Gross domestic product (billion dollars)	6,560	6,950	7,270	7,640	8,080
Capital expenditures (billion dollars):					
All industries	490	550 ^P	594 ^P	603 ¹	NA
Manufacturing	134	153 ^P	172 ^P	185 ¹	NA
Mining and construction	31	36 ^P	36 ^P	34 ¹	NA
Industrial production (1992=100):					
Total index	104	109	115	118	124
Manufacturing	104	110	116	120	127
Stone, clay, and glass products	102	108	111	115	120
Primary metals	106	113	117	119	125
Iron and steel	107	114	118	118	123
Nonferrous metals	104	113	116	120	126
Chemicals and chemical products	101	105	107	110	115
Mining	100	103	102	104	106
Metals	99	100	102	103	107
Coal	95	104	104	107	109
Oil and gas extraction	101	102	100	102	103
Stone and earth minerals	102	109	113	116	119
Capacity utilization (percent): ²					
Total industry	81	83	84	82	83
Mining	86	88	87	89	90
Metals	84	86	87	88	90
Stone and earth minerals	83	86	87	86	85
Housing starts (thousands)	1,290	1,460	1,350	1,480	1,490
Automobile production (thousands)	5,980	6,610	6,350	6,080	6,030
Highway construction, all public, expenditures (billion dollars)	31	34	34 ^P	36 ^e	37

^eEstimated. ^PPreliminary. NA Not available.

¹Planned expenditures.

²1997 estimates based on seasonally adjusted figures.

Sources: U.S. Department of Commerce, Federal Reserve Board, American Automobile Manufacturers' Association, and U.S. Department of Transportation.

in the midst of the current uncertainties of the capital markets.

Africa

In 1997, Africa witnessed a significant revival of mineral exploration and development following the end of sanctions against South Africa; the end of longstanding civil wars in Angola and Mozambique; privatization trends in Zambia and Congo (Kinshasa), formerly Zaire, and the liberalization of mining and foreign investment laws in many countries. According to the Metal Economics Group of Halifax, Nova

Scotia, \$662.6 million, or more than 16% of the combined exploration budgets of 279 companies, was expended in Africa. This was the largest growth in exploration expenditure of any region in the world. In addition, plans for more than \$18 billion in potential new mineral developments in the region were announced.

Much of the interest in exploration and development was centered in southern Africa. In Angola, the developments in the petroleum and diamond sectors were major. Two offshore petroleum discoveries, the Girassol and the Dahlia I blocks, were each estimated to contain more than 2 billion

barrels. With the return of foreign investment, two new diamond projects, Luo and Catoca, came into production. Total diamond production was expected to increase from 4 million to 5 million carats per year within 2 to 4 years. In Congo (Kinshasa), 10 companies had entered joint ventures with the state-owned mining companies to revitalize the copper-cobalt, zinc, gold, and manganese industries. Potential investment, subject to a return to political stability, could exceed \$2 billion. In Mozambique, planned new investment includes an aluminum smelter, a direct reduced iron plant, two new titanium mining and processing operations, and development of the Pande natural gas field and pipeline.

In South Africa, \$2.4 billion in planned new investment will be used to expand the Richards Bay coal export terminal and the Namakwa Sands titanium project, to modernize the aging steel plant at Vanderbijlpark and the Bayside aluminum smelter at Richards Bay, and to construct a major 1.25-million-metric-ton-per-year steel plant at Saldhana Bay and a new titanium mine and plant near Richards Bay. The six dominant mining houses continued their "unbundling" of assets, devolving more into holding companies than into operators. In October, two of the major mining houses merged their gold mining operations into a new company that will become the second largest gold producer in the world with a production capacity of 200 tons per year of gold. At about 490 tons, gold production was the lowest in 41 years.

In Namibia, diamond dredging in the offshore Koichab area was begun, major capital investment was secured for the Rossing open-pit uranium mine, and decisions were made to proceed with development of the \$600 million Haib copper and the \$164 million Scorpion zinc deposits. In Zambia, privatization of state-owned coal and copper operations was expected to be completed by yearend. The Zambian Privatization Agency divided the state copper company into nine entities and sold them separately. A consortium of U.S., Canadian, and South African mining companies was negotiating to acquire the Nkana and the Nchanga Divisions, representing more than 50% of national production, for a several-hundred-million-dollar buy-in and a commitment to invest an additional \$1 billion to expand operations.

In west Africa, gold exploration continued in Burkina Faso, the Central African Republic, Côte d'Ivoire, Ghana, Guinea, Mali, Niger, and Senegal. In Ghana, the Damang and the Obotan Mines were brought into production during 1997; the Wassa, the Bibiani, and the Tarkwa Mines are scheduled to start-up in 1998. Petroleum activity continued with exploration offshore of Benin, Côte d'Ivoire, Equatorial Guinea, Ghana, Nigeria, and Senegal. Although exploration activity declined in Nigeria, natural gas production, which will reduce the enormous volume of gas burned off, began.

Gold also was the target of exploration efforts in the east African countries of Eritrea, Ethiopia, Uganda, and Tanzania. In Tanzania, four newly discovered deposits

each contain from 1 million to 5 million troy ounces of gold; two of these are undergoing engineering feasibility studies. Also in Tanzania, a Canadian-Australian joint venture is studying the feasibility of bringing the Kabanga nickel deposit into production by 2001.

Middle East

The Governments of most Middle Eastern nations continued to encourage foreign and private interests in mineral development. Petroleum and petrochemicals remain the most important mineral commodities for the majority of countries in the region.

In accordance with the United Nations, Iraq resumed limited oil exports in August with the larger share of the oil transiting through Turkey. In Saudi Arabia and Syria, the discovery and development of domestic petroleum reservoirs with light, low-sulfur, crude oils provided higher priced export crudes. Both countries are endorsing the increased usage of natural gas to relieve more liquid fuels for export. Iran opened the long-awaited Bandar Abbas oil refinery during the year, with full capacity of 232,000 barrels per day expected to be reached in 1998.

The region's petrochemical industry is growing rapidly. In Kuwait, a \$2 billion petrochemical complex at Shuayba opened in September with Government equity at 45%. A number of Saudi Arabian petrochemical complexes, under new construction or expansion, will come on-stream between 1997 and 2000, increasing the country's petrochemical production to 28 million tons per year.

Asia and the Pacific

Australia continued to attract mineral investment in 1997. In September, a major Australian iron ore mining company announced that it would begin development of its sixth iron ore mine in Western Australia's Pilbara region. Initial output, scheduled for mid-1999, was expected to be 5 million tons per year of high-grade pisolitic fines. In the same month, a major Australian minerals company overcame the last obstacle in its acquisition and development of a lead-zinc-silver mine in Queensland. The mine is expected to cost about \$90 million and to produce 780,000 tons per year of concentrates for use in the company's 205,000-ton-per-year smelter in the Netherlands. A Japanese consortium started renovations of a newly acquired 120,000-ton-per-year copper smelter and refinery complex at Port Kembla, New South Wales, Australia.

At its 15th National Congress in September, the Communist Party of China announced plans to accelerate the reform of state-owned enterprises that was implemented in the early 1990's. The Chinese Government plans to convert large- and medium-sized state-owned enterprises into independent corporations. The Government will share equity in the new corporations but will bear limited responsibility for their debts. The enterprises will be responsible for their own profits and

TABLE 3.—VALUE OF NONFUEL MINERAL PRODUCTION IN THE UNITED STATES AND PRINCIPAL NONFUEL MINERALS PRODUCED IN 1997^{p 1}

<u>State</u>	<u>Value (thousands)</u>	<u>Rank</u>	<u>Percent of U.S. total</u>	<u>Principal minerals, in order of value</u>
Alabama	\$805,000	18	2.04	Cement (portland), stone (crushed), lime, sand and gravel (construction), cement (masonry).
Alaska	827,000	17	2.10	Zinc, lead, gold, sand and gravel (construction), silver.
Arizona	3,520,000	1	8.91	Copper, sand and gravel (construction), cement (portland), molybdenum, lime.
Arkansas	535,000	24	1.36	Bromine, stone (crushed), cement (portland), sand and gravel (construction), sand and gravel (industrial).
California	2,810,000	3	7.13	Cement (portland), sand and gravel (construction), boron, stone (crushed), gold.
Colorado	521,000	26	1.32	Sand and gravel (construction), cement (portland), molybdenum, stone (crushed), gold.
Connecticut ²	64,800	46	.16	Stone (crushed), sand and gravel (construction), stone (dimension), clays (common), gemstones.
Delaware ²	6,490	50	.02	Magnesium compounds, sand and gravel (construction), gemstones.
Florida	1,740,000	6	4.42	Phosphate rock, stone (crushed), cement (portland), sand and gravel (construction), titanium (ilmenite).
Georgia	1,770,000	4	4.49	Clays (kaolin), stone (crushed), cement (portland), clays (fuller's earth), sand and gravel (construction).
Hawaii ²	99,900	43	.25	Stone (crushed), cement (portland), cement (masonry), gemstones.
Idaho	442,000	31	1.12	Phosphate rock, gold, sand and gravel (construction), molybdenum, silver.
Illinois	880,000	16	2.23	Stone (crushed), cement (portland), sand and gravel (construction), sand and gravel (industrial), lime.
Indiana	669,000	21	1.70	Stone (crushed), cement (portland), sand and gravel (construction), lime, cement (masonry).
Iowa	493,000	29	1.25	Stone (crushed), cement (portland), sand and gravel (construction), gypsum (crude), lime.
Kansas	547,000	23	1.39	Cement (portland), salt, stone (crushed), helium (Grade-A), sand and gravel (construction).
Kentucky	476,000	30	1.21	Stone (crushed), lime, cement (portland), sand and gravel (construction), clays (ball).
Louisiana	379,000	35	.96	Salt, sulfur (Frasch), sand and gravel (construction), stone (crushed), sand and gravel (industrial).
Maine	88,200	44	.22	Sand and gravel (construction), cement (portland), stone (crushed), peat, cement (masonry).
Maryland	401,000	33	1.02	Stone (crushed), cement (portland), sand and gravel (construction), cement (masonry), stone (dimension).
Massachusetts	213,000	39	.54	Stone (crushed), sand and gravel (construction), stone (dimension), lime, clays (common).
Michigan	1,560,000	9	3.96	Cement (portland), iron ore (usable), sand and gravel (construction), magnesium compounds, stone (crushed).

See footnotes at end of table.

TABLE 3.—VALUE OF NONFUEL MINERAL PRODUCTION IN THE UNITED STATES AND PRINCIPAL NONFUEL MINERALS PRODUCED IN 1997^{P 1}—Continued

<u>State</u>	<u>Value (thousands)</u>	<u>Rank</u>	<u>Percent of U.S. total</u>	<u>Principal minerals, in order of value</u>
Minnesota	\$1,600,000	8	4.06	Iron ore (usable), sand and gravel (construction), stone (crushed), sand and gravel (industrial), stone (dimension).
Mississippi	137,000	42	.35	Sand and gravel (construction), cement (portland), clays (fuller's earth), stone (crushed), clays (bentonite).
Missouri	1,320,000	10	3.34	Stone (crushed), lead, cement (portland), lime, zinc.
Montana	498,000	28	1.26	Copper, gold, cement (portland), palladium metal, molybdenum.
Nebraska	161,000	41	.41	Cement (portland), sand and gravel (construction), stone (crushed), cement (masonry), clays (common).
Nevada	3,030,000	2	7.69	Gold, copper, silver, sand and gravel (construction), diatomite.
New Hampshire ²	60,200	47	.15	Sand and gravel (construction), stone (crushed), stone (dimension), gemstones.
New Jersey	296,000	37	.75	Stone (crushed), sand and gravel (construction), sand and gravel (industrial), greensand marl, peat.
New Mexico	994,000	13	2.52	Copper, potash, sand and gravel (construction), cement (portland), perlite (crude).
New York	904,000	15	2.29	Stone (crushed), cement (portland), salt, sand and gravel (construction), zinc.
North Carolina	758,000	20	1.92	Stone (crushed), phosphate rock, sand and gravel (construction), sand and gravel (industrial), clays (common).
North Dakota	31,600	48	.08	Sand and gravel (construction), lime, clays (common), sand and gravel (industrial), gemstones.
Ohio	984,000	14	2.49	Stone (crushed), sand and gravel (construction), salt, lime, cement (portland).
Oklahoma	411,000	32	1.04	Stone (crushed), cement (portland), sand and gravel (construction), sand and gravel (industrial), iodine (crude).
Oregon	272,000	38	.69	Sand and gravel (construction), stone (crushed), cement (portland), diatomite, lime.
Pennsylvania ²	1,240,000	11	3.13	Stone (crushed), cement (portland), lime, sand and gravel (construction), cement (masonry).
Rhode Island ²	22,600	49	.06	Sand and gravel (construction), stone (crushed), sand and gravel (industrial), gemstones.
South Carolina	507,000	27	1.28	Cement (portland), stone (crushed), gold, sand and gravel (construction), cement (masonry).
South Dakota	340,000	36	.86	Gold, cement (portland), stone (crushed), sand and gravel (construction), lime.
Tennessee	786,000	19	1.99	Stone (crushed), zinc, cement (portland), sand and gravel (construction), clays (ball).
Texas	1,700,000	7	4.31	Cement (portland), stone (crushed), sand and gravel (construction), magnesium metal, salt.
Utah	1,760,000	5	4.46	Copper, gold, molybdenum, magnesium metal, sand and gravel (construction).

See footnotes at end of table.

TABLE 3.—VALUE OF NONFUEL MINERAL PRODUCTION IN THE UNITED STATES AND PRINCIPAL NONFUEL MINERALS PRODUCED IN 1997¹—Continued

State	Value (thousands)	Rank	Percent of U.S. total	Principal minerals, in order of value
Vermont ²	\$68,200	45	0.17	Stone (dimension), stone (crushed), sand and gravel (construction), talc and pyrophyllite, gemstones.
Virginia	600,000	22	1.52	Stone (crushed), sand and gravel (construction), cement (portland), lime, kyanite.
Washington	522,000	25	1.32	Sand and gravel (construction), magnesium metal, stone (crushed), cement (portland), gold.
West Virginia	190,000	40	.48	Stone (crushed), cement (portland), sand and gravel (industrial), lime, salt.
Wisconsin	389,000	34	.98	Stone (crushed), sand and gravel (construction), copper, sand and gravel (industrial), lime.
Wyoming	996,000	12	2.52	Soda ash, clays (bentonite), helium (Grade-A), cement (portland), stone (crushed).
Undistributed	29,800	XX	.08	
Total	39,500,000	XX	100.00	

²Preliminary. XX Not applicable.

¹Data are rounded to three significant digits; may not add to totals shown.

²Partial total; excludes values that must be concealed to avoid disclosing company proprietary data. Concealed values included with "Undistributed."

losses. The Government will encourage enterprises to merge, to declare bankruptcy if necessary, and to increase efficiency by downsizing staff.

In the wake of the Busang gold scandal, the Indonesian Government unveiled proposed revisions to the new mining Contracts-of-Work. Following widespread expressions of concern that these revisions would act as a major deterrent to future mining investment in the country, however, the Government subsequently canceled plans to revise the mining regulations. A U.S. oil company discovered a massive natural gas field with a proven reserve of 178 billion cubic meters in the onshore Wiriagar and the offshore Berau blocks in Irian Jaya. The Natuna fields in the South China Sea, one of the world's largest gasfields with in-place reserves of 6.28 trillion cubic meters, is expected to supply liquefied natural gas to Asian markets by 2003.

To meet the growing demand for copper, nickel, and zinc in Asian markets, Japan plans to undertake several expansion programs within the next 2 years. By 1999, Japan's refining capacities will be 1.34 million tons per year of copper, 36,000 tons per year of nickel, and 669,200 tons per year of zinc.

To encourage foreign investors to participate in exploration and development of Mongolian mineral resources, the Government revised its 1994 Mineral Resources Law and related Foreign Investment and Tax Laws in June 1997. The major provisions under the revised laws are as follows: expansion of areas open to exploration, establishment of a cadastral office to issue exploration licences and mining permits, reduction of the royalty rate for all minerals to

2.5%, reduction of corporate income tax to 30%, tax allowances for capital expenditure on infrastructure and accelerated depreciation of fixed assets, exemption of import duty on plant and equipment, and simplification of foreign investment procedures.

On New Caledonia, a report by an independent engineering consultancy concluded that establishment of a second nickel smelter in the north of the island of La Grand Terre would be feasible. The smelter would be a joint-venture project between a company predominantly owned by the local Kanaks, New Caledonia's indigenous people, and a major Canadian nickel company.

In Papua New Guinea, the world-class gold mine on Lihir Island in New Ireland Province came on-stream 3 months ahead of schedule and under budget, pouring its first gold from the treatment of oxide ore in May; the first gold from the higher-grade sulfide ore was poured in September. The operator of the Ok Tedi Mine signed two agreements dealing with the compensation of communities and landowners affected by severe environmental changes caused by the mine's operations. Under the Lower Ok Tedi agreement, about \$28.6 million will be paid to affected river communities along the lower reaches of the Ok Tedi River basin during the remaining life of the mine.

In the Philippines, a junior Australian mining company announced plans to reopen the Nonoc nickel mine-smelter-refinery complex on Nonoc Island. The nickel complex was foreclosed in 1986 by the Philippine Government. Work was expected to begin in late 1997 and to take 18 months to complete at a cost of about \$550 million. Capacity after refurbishment is expected to be about 35,000 metric tons

per year of nickel and about 1,800 metric tons per year of cobalt.

Europe and Central Eurasia

In most of the 15 countries of the EU, the rates of economic growth increased and tight monetary policies eased. Continued liberalization of investment laws allowed greater foreign participation in mineral projects. Mineral exploration was encouraged by deregulation and tax relief. These improved conditions encouraged increased consumption of minerals. In addition, various EU member countries continued to privatize state-owned mineral enterprises. Following the privatization of the last 2 to 3 years, more than 90% of the European steel industry is now in private hands.

The trend in metallic minerals exploration in Western Europe continued to be for copper, gold, lead, and zinc. Exploration for copper was mainly in France and Portugal, and exploration for lead and zinc was mainly in Ireland and Spain. A major gold deposit was being developed in northern Spain. Continued discoveries of gold mineralization encouraged further exploration efforts, particularly in Finland, Greenland, east-central Portugal, Sardinia, Scotland, and northern Spain.

The trend in the denationalization of state-owned and state-operated industrial enterprises in Central and Eastern Europe continued in 1997. This was underscored when Poland's giant copper producer, KGHM, floated its stock on the Warsaw Exchange. Foreign investment in the region remained focused on gold exploration and mine development, as well as on the acquisition of industrial mineral properties to produce such commodities as clays, dimension stone, limestone, perlite, and silica sand. Major foreign investments also were made in facilities producing cement, chemicals, and float glass.

Central Europe (the Czech Republic, Hungary, Poland, and Slovakia) appears to be ready for large investments for highway expansion, as well as attendant services, such as gas stations, repair facilities, warehouses, etc. This will result in increased consumption of cement, structural steel, and other construction materials.

Mineral production in the countries of the Former Soviet Union (FSU) was marked more by the transformation of the mineral industries into market oriented, profit-seeking enterprises than by any major changes in the level of production or the pattern of exports. The changes that occurred in production levels and export patterns were geared to this transformation as mineral-producing enterprises tried to adjust their production profiles to meet market demand. These enterprises moved further towards exporting to world markets or to selling their products for convertible currency within the FSU.

Enterprises in all mineral sectors in the FSU were engaged in various methods of transformation to become profitable producers, including joint ventures, downsizing, conglom-

eration, renovation, changing production profiles, issuing stocks, contracting for foreign management, and selling companies to foreign and domestic investors. Following the breakup of the Soviet Union, investment in mineral-producing enterprises outside the oil and gold sectors sparked little interest. Now, however, investors are looking to invest in quality enterprises that produce a wide variety of mineral products. Enterprises that have high-quality deposits and processing facilities are now passing into the hands of a new group of domestic and foreign investors, who appear to be prepared to invest in these enterprises and to reorganize their production to make them more competitive in the global market. The fate of those enterprises that have poorer quality assets or are in sectors for which the world market is in a downturn remains uncertain. One major factor impeding the survival of many mineral-producing enterprises is the almost total drop in demand for their output within the FSU, with the prospects for a revival of demand still in the too-distant future in terms of the survival of these enterprises. A trend to create a reformed mineral-production industry controlled, for the most part, by private investors, however, is now emerging in the FSU.

Latin America and Canada

Investment monies continued to flow into Latin America. This movement was stimulated by continuing clarification and refinement of mining laws, as well as ongoing privatization of government-owned companies. Concomitantly, changes to general investment laws to accommodate foreign and private interests attracted worldwide attention. Although exploration focused primarily on gold, copper was sought not only in Chile, but in Central America, Mexico, and Peru. Latin America continued to be an important source of mineral commodities as trade in minerals generally increased throughout the region. Canada, Mexico, and Venezuela supplied much of the petroleum requirement of the United States. Regional consumption of minerals may also be increasing; South American demand for steel had been projected to grow by 12%.

In the midst of a long recovery from the financial crisis and peso devaluation of early 1995, Mexico's mineral industry started 1997 in robust condition. Production of metals continues to increase, and that of industrial minerals improved after being slowed in 1995. Capital flowed into the Mexican economy as the result of increased mineral exports and investment in mineral projects. As a result of its long-established program of privatization, Mexico now has 372 international mining companies conducting exploration and production projects.

An agreement to develop the Cupey nickel mine and processing plant in Cuba and to construct a nickel refinery in Canada was announced in July. The Cupey property, located in the Moa Bay area, 22 million tons of proven and 85 million tons probable reserves at a grade of 1.32% nickel and 0.115% cobalt at a cut-off grade of 1% nickel. The project is designed to produce 30,000 tons per year of

nickel and 1,400 tons per year of cobalt for 25 years and would bring Cuba's nickel production capacity to about 100,000 metric tons. In April, construction of the Phase I gold-leaching operation began in the Mantua project in Pinar del Río Province. Phase I was designed to recover 800,000 ounces of gold in 2 years from the gossan cap, which has reserves of 2 million metric tons with 1.44 grams of gold per ton and 11 grams of silver per ton.

Argentina's Bajo de La Alumbrera copper-gold project is on schedule to begin shipping concentrates in October. The project is designed to produce an average of 180,000 tons per year of copper and 640,000 ounces per year of gold for the next 20 years.

New amendments to Brazil's 1988 Constitution allow private firms to participate in the mineral sector. Now, 100% equity ownership is allowed, profits can be expatriated, and the private sector may participate in public utilities previously reserved for the Government. The 40-year Government monopoly of the petroleum industries has ended, allowing Petrobras, the state-owned petroleum company, to enter into joint ventures with foreign investors. The steel industry is being privatized, and the petrochemicals and the mining industries also are moving in that direction.

The Government of Bolivia peacefully ended the siege of the Huanuni tin mine by negotiating an agreement with the cooperative miners, who have been traditionally against any form of private ownership particularly that involving foreign participation in ownership. Capitalization of the Vinto works, the state-owned antimony and tin smelter, was, however, postponed again; this is the process by which private investors obtain ownership of a state-owned entity by subscribing new equity into the entity. This process also was used to transfer Yacimientos Petrolíferos Fiscales Bolivianos (YPFB), the state-owned petroleum company, to the private sector. The resulting consortium, Transredes, will operate a network of 22 existing oil and gas pipelines and the long-awaited Bolivia-to-Brazil gas transmission line. Construction of the \$500 million Bolivian stretch began in October with the first deliveries expected in late 1998.

In Chile, Codelco, the state-owned copper-mining corporation, began production at its \$700 million Rodomiro Tomic Mine. This is the first mine to be developed solely by Codelco, whose previous projects have been limited to expansions of existing operations. Annual output during the 22-year life of the mine will increase from 150,000 to 225,000 tons per year. A proposal by Chilean officials to raise taxes paid by the country's booming mining sector caused a reaction among multinational companies that are investing billions of dollars there. The mining industry

argued that imposition of new taxes would impair Chile's ability to attract new mining investment.

The Colombian Government proceeded with efforts to privatize its mining sector and, early in the year, sold its remaining interest in Colombia's only nickel producer, Cerro Matoso, to its South African owner. In August, an international consortium was awarded a 30-year contract to develop the Cerrejón Zona Sur coal deposit in the Guajira Department. The same consortium combined two other important adjacent coal properties, the Cerrejón Zona Centro and the Oreganal, that together produced about 3.3 million tons of coal in 1996. Expansion plans for the combined property call for 16 million tons per year of coal to be produced.

Peru's success in controlling terrorism and restoring political stability, along with changes in laws governing mining and investment, and a program to privatize state-owned companies have attracted many foreign investors. As a result of revisions to the General Mining Law of 1992, mining contracts and ventures are guaranteed immunity from unilateral changes by any Governmental authority without appropriate legal or administrative remedy in the Civil Code. This allowed \$3 billion to be invested in mineral exploration, and \$3.1 billion in mine development, expansion, and modernization. Of this, commitments in privatized mining projects amounted to almost \$1 billion. A further \$5 billion is expected to be invested in new mine projects, such as Antimina, La Granja, and Quelleveco for base-metals and Pierina for gold.

In spite of the migration of many Canadian companies' operations to the United States and, especially, Latin America, mining in Canada remained strong in 1997 after reaching new highs in 1996. Output of mineral commodities grew by 14% over that of the previous year. Monies committed to exploration in Canada increased by 50% in 1996, reaching almost \$700 million. After spreading to almost every part of Canada, exploration for diamond continued, but with less public interest than during the wild claim-staking rush of 2 or 3 years before. A major newsmaker in the Canadian mining industry continued to be the huge nickel-copper-cobalt discovery at Voisey's Bay on the coast of Labrador, where exploration drilling expanded the limits of the ore body. Following the Bre-X scandal, Canadian mining circles called for more stringent due-diligence requirements for companies trading on Canadian exchanges.

¹The regimes of some countries in this volume may not be recognized by the U.S. Government. The information contained herein is technical and statistical and is not to be construed as conflicting with or contradictory to U.S. foreign policy.