

Minerals in the World Economy

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THE expansion of the world economy which has been in progress since 1958 continued in 1963 and both production and consumption of minerals rose. Gross national product (GNP) rose sharply in the United Kingdom and Japan, continued to expand in the United States and Canada, and maintained a high though slightly declining rate of growth in the European Economic Community (EEC) despite the appearance of excess capacity in certain lines and inflationary pressures in Italy and France. The steel and motor vehicle industries both increased output in North America, Western Europe, and Japan. The less developed areas benefited substantially from an improvement in their terms of trade, and their export earnings increased some 8 percent in 1963; although estimates of GNP for the majority of them are not yet available, it is probable that this increase was partly reflected in a substantial rise of GNP.²

In the United States the expansion was steady and extended through all sectors of the economy producing no distortions likely to disturb its continuing growth; at yearend with unemployment still at about 5.5 percent of the labor force and operating rates of industry estimated at about 87 percent of capacity, there was a substantial margin for further expansion. Though the balance of payments was still in heavy deficit for the year, in the last half it was moving rapidly toward equilibrium as net exports rose and capital outflows declined; prices were relatively stable, inventories increased only slightly and the activity of mineral-consuming industries remained high, steel output rising by 11 percent to highest level since 1957 and the auto industry output equalling the 1955 record.³

The economic expansion outside the United States contained some elements of greater uncertainty. The rapid rise of the United King-

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² International Monetary Fund. *International Financial News Survey*, v. 15, No. 49, 1963, pp. 425-432; v. 16, No. 3, 1964, pp. 17-24; v. 16, No. 7, 1964, pp. 49-56; v. 16, No. 8, 1964, pp. 57-63; v. 16, No. 14, 1964, pp. 117-124; v. 16, No. 15, 1964, pp. 125-132; v. 16, No. 16, 1964, pp. 133-140; v. 16, No. 17, 1964, pp. 141-148; v. 16, No. 18, 1964, pp. 149-156; v. 16, No. 19, 1964, pp. 157-164.

³ International Monetary Fund. *International Financial Statistics*, v. 17, No. 6, June 1964, 311 pp.

National Institute of Economic and Social Research. *Economic Review* No. 27, February 1964, 92 pp.

United Kingdom Treasury. *Preliminary Estimates of National Income and Balance of Payments 1963*. Cmd. 2328, April 1964, 21 pp.

U.S. Department of Commerce. *Survey of Current Business*, January 1964, 65 pp.

U.S. Department of Commerce. *Survey of Current Business*, v. 44, No. 1, 65 pp., and v. 44, No. 3, 60 pp. *Economic Report of the President, January 1964*, Government Printing Office, Washington, D.C., 304 pp.

dom's output was accompanied by growing pressure on labor supplies, rising wage rates, and a widening trade gap as producers began to restock their inventories of raw materials toward the end of the year. The prospects of a further expansion of demand that might put excessive strain on resources and the balance of payments caused authorities to consider a slight cutback in the growth rate in 1964. In the EEC the overall expansion of the economy by 4 percent in 1963 concealed mounting inflationary pressures, continuing wage rises, and accelerating consumer price increases which led authorities, particularly in Italy and France, to take action to restrict the pressures of demand; the trade deficit with non-EEC countries doubled from US\$1,500 million in 1962 to US\$3,000 million in 1963 and the balance of payments surplus on trade and factor income was reduced to about US\$500 million. A 19 percent increase in fuel imports from non-EEC sources was a major factor in the deterioration of the balance of payments. In Japan, too, the high rate of growth in 1963 had led to a large increase in imports, a widening of the adverse trade balance, and rising inflationary pressures; Japanese authorities (like the British authorities) decided that the rate of growth must be cut back slightly.⁴

The primary producing and less industrialized countries had a better year than in 1962 or for some years past, and benefited from a general rise in the prices of their export products. The volume of their exports continued to increase and import prices changed little. Their terms of trade improved by practically the full amount of the commodity price increases, bringing them back to the level of 1961, and about 10 percent below the high levels of 1950. Export earnings increased and the balances of payments generally improved; although the bulk of the increases in monetary reserves was concentrated in a few countries, the majority of the primary producers recorded somewhat higher reserves. Benefiting from a rise in the volume of petroleum exports, though not from price increases, the oil producers fared somewhat better than most other primary producers.⁵

Much of the improvement in commodity prices and the terms of trade of the less developed countries apparently can be traced to the effects of weather, and caution should therefore be exercised in interpreting it as a continuing trend. The abnormally cold Northern Hemisphere winter of 1962-63 had an adverse effect on crops there, as did the prevalence of drought in some regions; while the cold winter (coupled with a French coal strike early in the year) sharply increased European requirements for fuel imports. Only the improvement in nonferrous metal prices appeared to reflect a changing basic supply

⁴ European Economic Community. *Monthly Statistics. Foreign Trade, 1964-No. 2.* 110 pp.

European Economic Community Commission. *The Economic Situation in the Community. Quarterly survey. December 1963.* 119 pp. International Monetary Fund. *International Financial News Survey*, v. 15, No. 49, 1963, pp. 425-432; v. 16, No. 1, 1964, pp. 1-8; v. 16, No. 2, 1964, pp. 9-16; v. 16, No. 3, 1964, pp. 17-24; v. 16, No. 10, 1964, pp. 77-84; v. 16, No. 15, 1964, pp. 125-132; v. 16, No. 16, 1964, pp. 133-140; v. 16, No. 17, 1964, pp. 141-148; v. 16, No. 18, 1964, pp. 149-156.

National Institute of Economic and Social Research. *Economic Review No. 27*, London, February 1964, 92 pp.; *Economic Review No. 28*, London, May 1964, 76 pp.

U.S. Embassy, Tokyo, Japan. *Airgram A 1064*, March 6, 1964, 14 pp.

⁵ National Institute of Economic and Social Research. *Economic Review No. 27*, London, February 1964, 92 pp.; No. 28, London, 1964, 76 pp.

United Nations. *World Economic Survey 1963. Part II, Current Economic Developments.* 95 pp.

United Nations. *Commodity Survey 1963 (Preliminary).* UN Conference on Trade and Development, Document E/Conf. 46/115, May 7, 1964.

and demand position, as the continuing high level of world industrial output began to catch up with the excess production capacity created during the 1950's.

The developing pattern of the free world economy in 1963 thus showed a continuing strong expansion in the United States and in Canada, a strong rise in the United Kingdom and Japan which the authorities of both countries believed must be restrained primarily for balance of payments reasons, and a slightly smaller rate of expansion in the EEC than during 1962, a rate whose maintenance may be affected by efforts to restrain internal inflationary pressures. All three of the areas outside North America, more dependent than the United States and Canada on imported raw materials, and all subject in some degree to inflationary pressures in 1963, appeared to be moving towards balance of payments deficits. The U.S. balance appeared finally to be moving towards equilibrium though still in heavy deficit. The convergence of growth rates in the neighborhood of 4 to 5 percent thus appeared to represent different cyclical phases in the growth trend of the free world economy.

Despite the rise of smaller industrial centers in Australia, India, South Africa, Brazil, Mexico, and a few other countries, the United States, Western Europe, and Japan remain the chief motive forces in the free world economy and their requirements are the principal determinants of demand for minerals. Together they account for about two-thirds of the free world's imports of ores, metals, and fuels. The developments of the past 5 years have brought them into a more balanced relationship, and the U.S. economy is no longer the completely decisive factor that it was for a decade after World War II. In the case of minerals, for example, a continuation of the rising trend in the prices and volume of primary producers' exports depends on continuing high demands from all three areas; of these, the EEC is the largest importer and both the United Kingdom and Japan are important markets.

The economies of the Communist countries in Europe and Asia have also expanded at a high rate during the past 5 years but the nature and structure of their economies, as well as their commercial policies, cause them to participate in the world economy on what is essentially a marginal basis. Their domestic economies are completely and centrally planned, the bulk of production is destined for domestic consumption and use, and surpluses have normally been exported primarily to obtain needed supplies of raw materials, equipment or other goods. Even in such cases surpluses are exchanged chiefly among themselves and are exported outside the group usually in exchange for goods not available within it. For this reason their rates of growth do not normally have the same impact on or importance for the world economy as do those of other regions. More recently, however, Communist external transactions have assumed greater importance as these countries have embarked on programs of economic aid to the less developed countries and have begun to export goods to the free world in order to obtain capital equipment. On the supply side of the mineral industries they have played a significant role in a number of commodities such as petroleum, apatite and potash, manganese, chromite, tungsten, antimony, mercury, and the platinum metals; on the demand

side they have been significant importers of copper. Their role may expand if the economic solidarity of the group should dissolve.

The 1963 changes represent for the most part a continuation of trends of previous years. In essence, the trends reflect a period of very rapid growth of the West European and Japanese economies, increasing their overall size and absorbing their domestic resources of raw materials until further growth became dependent on major increases in imports from outside.

The differential growth rates of the three major free world areas have given a new shape and structure to the free world economy. In both Western Europe and Japan powerful investment booms involved a sizable expansion of capacity in major industries, an increasing shift to heavy industry and consumer durables, and a sharply increased consumption of all primary products, especially ores, metals, and fuels. A major development in both areas has been a massive shift from coal to petroleum as a source of energy. The more rapid growth of Western Europe and Japan not only restored them to their prewar positions of eminence in the world economy, but also brought about a redistribution of the world's currency reserves in their favor.⁶

The steady expansion of the world economy since 1958 has also been assisted by the relative stability of commodity prices since the recession of 1957-58, and by the restoration of currency convertibility by the major European countries with the consequent elimination of their exchange controls and quota restrictions. Ample capacity in practically all lines contributed to the stability of prices. This was especially true in minerals, for which investments stimulated by the Korean War actually created surplus capacity. The increasing ease of capital transfers and goods movements stimulated both trade and investment throughout the free world. The net effect was to reintegrate the free world's economies on a scale not seen since 1939.

A rather general measure of the industrial expansion in the past 5 years is given by the United Nations indexes of industrial production.

TABLE 1.—Indexes of world industrial production, by region
(1958=100)

Region	1959	1960	1961	1962	1963 ¹
World ²	110	118	122	130	137
Northern North America ³	113	116	117	126	132
Europe ³	106	116	122	127	133
European Economic Community.....	106	118	125	132	133
European Free Trade Association.....	106	113	114	117	121
Japan.....	124	156	186	201	219
Asia, East and Southeast ⁴	109	122	130	141	154
Latin America ⁵	106	112	119	123	123
U.S.S.R.....	111	122	133	146	158
Industrialized countries.....	110	117	121	129	136
Less industrialized countries.....	107	119	130	138	146

¹ Preliminary figures.

² Excludes European and Asian Communist countries except Yugoslavia.

³ United States and Canada.

⁴ Excludes Japan, Cambodia, Laos, and Asian Communist countries; includes Iran, Afghanistan, Pakistan, India, Ceylon, Burma, Thailand, Malaysia (except Sabah), South Viet-Nam, Brunei, Indonesia, Philippines, Hong Kong, Taiwan, and Republic of Korea.

⁵ Central and South America and the Caribbean Islands.

Sources: United Nations. Monthly Bulletin of Statistics. May 1964; for European Free Trade Association (EFTA), Organization for Economic Cooperation and development (OECD) General Statistics. March 1964, rebased on 1958=100.

⁶ Economic Report of the President. January 1963, pp. 91-129.

PRODUCTION

The United Nations index of free world mining production in 1963 rose about 3 percent over 1962 output levels, with the chief increases occurring in iron and steel, aluminum, lead, and the two major fuels. Bureau of Mines data indicate that total world output of steel ingots and castings rose about 7 percent, although iron ore production increased only about 2 percent. Of the minerals associated with the steel industry, output of manganese ore, magnesite, and molybdenite rose, while production of fluorspar, chromite, and ores of vanadium, tungsten, and nickel declined. Among the nonferrous metals, aluminum production continued its growth trend and increased 9 percent though bauxite output declined 2 percent. Total world mine copper output, still under voluntary restrictions and affected by strikes and by political instability in the Republic of the Congo (Leopoldville), rose only about 2 percent. Mine output of lead increased about 1.5 percent and of zinc 2 percent. Mine production of tin increased marginally with small increases in the U.S.S.R., Malaysia, Thailand, Bolivia, and Nigeria offsetting a sharp reduction in Indonesia; the gap between new supply and demand remained, being filled by U.S. stockpile releases and the drawing down of other stocks. Industrial demand pressures also continued on silver, with new production inadequate for requirements and the shortfall being met by U.S. Treasury stocks and other supplies. Gold output rose by 4 percent and silver by 3 percent. Among the nonmetals, total output of sulfur rose by about 2 percent, with a 4 percent increase in output of elemental sulfur more than offsetting a decline in production from pyrites; potash production rose about 11 percent, the main factors being sharp increases in the United States and Canada; while phosphate output rose by about 6 percent, the chief increases occurring in the United States, the U.S.S.R. and Communist Asia, Morocco, and Tunisia. World cement output rose by about 5 percent. Production of coal rose about 4 percent and crude petroleum about 7 percent.⁷

Among free world countries mine output, including petroleum, rose more rapidly during 1963 in the less industrialized countries than in the major industrial areas, reflecting the growing dependence of the latter on ores and minerals from outside their territories; the United Nations index of the volume of mining production for the industrialized countries rose over 1962 levels by 2 percent as compared with a 7 percent rise in the index for less industrialized countries.

In 1963 the output of crude petroleum and natural gas continued to maintain a more rapid rate of growth than coal and metals.

The rates of increase since 1958 in output of the more important minerals, according to United Nations indexes varied substantially.

The United Nations indexes exclude the output of the European and Asian Communist countries and, to that extent, do not reflect accurately the trends of total world production. Data prepared by the Bureau of Mines summarize total world production of 65 major minerals for the years 1959-63, with the averages for the preceding 5 years given for purposes of comparison. The Bureau data include

⁷ Engineering and Mining Journal. V. 165, No. 2, February 1964, pp. 90-155, 160.
United Nations. Monthly Bulletin of Statistics. May 1964, v. 18, No. 5, 199 pp.

estimates for European and Asian Communist countries and the coverage is therefore more complete.

In table 6 the percentage distribution of 1963 world production of these minerals among the eight major geographical regions is shown, as well as a breakdown between Western Hemisphere and Eastern Hemisphere production.

TABLE 2.—Indexes of free world mining production, by regions

(1958=100)

Region	1959	1960	1961	1962	1963 ¹
Free World ²	104	111	117	123	127
Northern North America ³	104	107	108	112	114
Europe ⁴	98	100	102	103	104
EEC.....	98	101	103	103	102
EFTA.....	98	96	95	97	97
Japan.....	99	108	116	118	116
Asia, East and Southeast ⁵	110	124	132	144	151
Latin America ⁶	106	112	114	122	125
Industrialized countries.....	103	105	107	110	112
Less industrialized countries.....	108	130	145	161	172

¹ Preliminary figures.

² Excludes European and Asian Communist countries except Yugoslavia.

³ United States and Canada.

⁴ Excludes Japan, Cambodia, Laos, and Asian Communist Bloc; includes Iran, Afghanistan, Pakistan, India, Ceylon, Burma, Thailand, Malaysia (except Sabah), South Viet-Nam, Brunei, Indonesia, Philippines, Hong Kong, Taiwan and Republic of Korea.

⁵ Central America, South America, and Caribbean Islands.

Source: United Nations, Monthly Bulletin of Statistics, May 1964; for EFTA, OECD General Statistics, March 1964, rebased on 1958=100.

TABLE 3.—Indexes of free world mining production, by type¹

(1958=100)

Year	Metals	Coal	Crude petroleum and natural gas	Total
1959.....	104	97	107	104
1960.....	116	97	118	111
1961.....	118	96	128	117
1962.....	121	98	139	123
1963 ²	123	100	146	127

¹ Excludes European and Asian Communist countries except Yugoslavia.

² Preliminary figures.

Source: United Nations. Monthly Bulletin of Statistics. May, 1964.

TABLE 4.—Indexes of world production of major mineral commodities^{1, 2}

(1958=100)

Commodity	1959	1960	1961	1962	1963
Aluminum ³	115	129	126	138	152
Copper (smelter) ⁴	106	127	128	132	136
Pig iron.....	109	124	129	133	141
Steel, crude.....	111	125	130	133	143
Lead ⁵	94	100	104	103	108
Tin ⁶	94	119	113	119	119
Zinc ⁷	103	107	114	119	121
Coal ⁸	100	101	102	105	108
Petroleum (crude).....	108	116	123	134	143

¹ United Nations. Monthly Bulletin of Statistics. May 1964, Special Table B.² Excludes mainland China.³ Excludes U.S.S.R., Eastern Germany, Czechoslovakia, Rumania, and North Korea.⁴ Excludes U.S.S.R., East Germany, Albania, and North Korea.⁵ Excludes U.S.S.R. and Eastern Europe.⁶ Includes coal equivalent of brown coal and lignite.

TABLE 5.—World production of major minerals

Commodity	1954-58 (average)	1959	1960	1961	1962	1963
Metals:						
Aluminum..... thousand metric tons..	3,250	4,060	4,530	4,725	5,080	5,530
Antimony (content)..... do.....	50	53	53	52	54	56
Arsenic, white (free world) ¹ do.....	38	43	52	49	49	48
Bauxite..... do.....	19,325	23,000	27,390	29,280	30,940	30,250
Beryl..... metric tons.....	8,900	10,200	11,100	11,700	9,900	6,700
Bismuth..... do.....	2,100	2,300	2,400	2,350	3,000	2,950
Cadmium ² do.....	8,803	10,226	11,462	11,768	12,291	11,931
Chromite..... thousand metric tons.....	³ 3,910	3,910	4,430	4,235	4,395	4,055
Cobalt (content) (free world) ⁴ metric tons.....	13,600	14,800	14,200	13,400	14,400	11,500
..... do.....	3,624	2,737	3,184	3,418	4,178	4,833
Copper, mine (content) ⁵ thousand metric tons.....	3,270	3,670	4,220	4,400	4,620	4,740
..... do.....	3,440	3,840	4,570	4,640	4,860	4,990
Gold..... thousand troy ounces.....	37,800	42,600	45,100	47,200	49,800	51,700
Iron ore..... thousand metric tons.....	381,800	459,044	522,238	502,641	507,364	518,164
Iron, pig (incl. ferroalloys) ⁶ do.....	190,490	224,280	258,810	256,200	264,770	280,320
Lead, mine (content)..... do.....	2,250	2,330	2,390	2,390	2,510	2,550
Lead, smelter..... do.....	2,160	2,190	2,320	2,420	2,410	2,540
Magnesium..... do.....	96	75	93	106	133	141
Manganese ore..... do.....	11,564	12,952	13,574	13,533	14,302	14,600
Mercury..... thousand flasks (76 lb.).....	213	223	242	240	245	236
Molybdenum (Mo content) ⁷ metric tons.....	32,000	32,500	40,400	40,000	34,100	41,600
Nickel (content) thousand metric tons.....	246	286	326	366	362	347
Platinum-group metals thousand troy ounces.....	1,075	1,055	1,275	1,355	1,630	1,530
Selenium (free world)..... metric tons.....	804	743	758	950	967	957
Silver ⁸ thousand troy ounces.....	227,600	222,300	241,000	236,900	241,800	249,500
Steel ingots (incl. castings) thousand metric tons.....	266,330	305,270	346,150	350,860	359,500	386,030
Tellurium (free world)..... metric tons.....	86	116	176	170	180	143
Tin, mine (content)..... long tons.....	187,900	161,500	180,400	184,100	187,000	190,300
Tin, smelter..... do.....	189,500	155,400	189,300	184,000	189,600	191,700
Titanium-ilmenite ⁹ thousand metric tons.....	1,473	1,758	2,002	2,092	1,967	2,016
..... do.....	94	97	104	117	136	200
Tungsten concentrate—60 percent WO ₃ metric tons.....	66,400	55,500	65,600	70,200	66,500	58,700
Uranium oxide (U ₃ O ₈) (free world) do.....	(¹⁰)	39,340	37,350	32,050	31,320	27,400
Vanadium (V content) (free world) ¹¹ do.....	3,923	4,827	6,564	7,918	7,517	6,355
Zinc, mine (content) thousand metric tons.....	3,020	3,120	3,320	3,460	3,530	3,604
Zinc, smelter..... do.....	2,745	2,860	3,040	3,255	3,410	3,475

See footnotes at end of table.

TABLE 5.—World production of major minerals—Continued

Commodity	1954-58 (average)	1959	1960	1961	1962	1963
Nonmetals						
Asbestos ¹²thousand metric tons...	1,765	2,060	2,210	2,510	2,770	2,900
Barite ²do.....	2,655	2,790	2,850	2,860	3,115	2,905
Cement, hydraulic.....do.....	231,377	294,412	316,537	333,428	357,841	375,412
Corundum.....do.....	9	7	8	7	8	10
Diamond, gem.....thousand carats...	4,742	5,900	6,700	7,000	6,347	6,572
Diamond, industrial.....do.....	19,160	20,900	21,000	27,250	27,659	30,089
Diatomite ¹³thousand metric tons...	1,113	1,345	1,410	1,485	1,480	1,465
Feldspar ¹⁴do.....	1,230	1,370	1,520	1,560	1,570	1,620
Fluorspar.....do.....	1,620	1,720	2,020	2,070	2,190	2,120
Graphite.....do.....	280	370	450	410	530	660
Gypsum ¹⁵do.....	33,260	43,100	42,370	43,300	46,910	48,960
Magnesite.....do.....	4,700	5,500	6,250	7,550	7,800	8,200
Mica.....do.....	140	160	165	165	180	180
Phosphate rock ¹⁶do.....	32,700	38,375	41,900	45,475	48,200	51,200
Potash (marketable), K ₂ O equiv, do.....	7,500	8,500	9,100	9,700	9,800	10,900
Pumice ¹⁷do.....	7,680	9,700	10,820	11,840	12,250	13,340
Pyrites (incl. cupreous) ¹⁸do.....	17,400	18,900	20,100	19,600	20,100	20,000
Salt.....do.....	68,000	79,700	84,900	84,700	91,400	95,100
Strontium minerals (free world) ¹⁹do.....	10,892	9,700	11,800	12,900	7,800	15,200
Sulfur, native.....thousand metric tons...	6,459	7,180	7,810	8,440	8,330	8,250
Sulfur, byproduct elemental.....do.....	(10)	2,090	2,710	3,300	3,930	4,475
Talc, soapstone, and pyrophyllite.....do.....	1,835	2,345	2,520	2,710	2,705	2,855
Vermiculite (free world) ¹⁴do.....	228	236	244	253	268	298
Mineral fuels:						
Coal (all grades)						
.....thousand metric tons...	2,227,090	2,519,027	2,632,860	2,482,217	2,549,271	2,652,310
Anthracite.....do.....	145,010	175,700	176,700	174,200	179,800	183,500
Bituminous.....do.....	1,521,055	1,725,979	1,817,497	1,645,706	1,684,257	1,746,645
Lignite.....do.....	561,025	617,348	638,663	662,311	685,214	722,165
Coke, metallurgical.....do.....	246,311	260,456	279,616	272,049	273,126	284,257
Coke, other types ²⁰do.....	46,888	45,760	46,090	45,060	45,730	45,470
Fuel briquets.....do.....	105,300	104,600	108,300	113,100	118,500	121,700
Peat.....do.....	78,150	169,700	162,100	159,600	163,000	163,000
Petroleum, crude.....do.....	5,962,624	7,144,860	7,689,851	8,133,863	8,882,218	9,535,434

¹ Excludes Argentina, Austria, Finland, and United Kingdom.

² Excludes Bulgaria.

³ Excludes North Viet-Nam.

⁴ Excludes, Uganda.

⁵ Excludes Czechoslovakia, Hungary, Iran, Kenya, and Malaysia.

⁶ Excludes a negligible amount produced in the Republic of the Congo.

⁷ Excludes a negligible amount produced in Bulgaria, North Korea, Rumania, South-West Africa, and Spain.

⁸ Excludes a negligible amount produced in Bulgaria, Mozambique, Panama, and Turkey.

⁹ Excludes Brazil and U.S.S.R.

¹⁰ Data not available.

¹¹ Incomplete total, represents only countries for which data is available.

¹² Excludes a negligible amount produced in Czechoslovakia, Eritrea, North Korea, and Rumania.

¹³ Excludes Hungary and Rumania.

¹⁴ Excludes China, Republic of Korea, and Rumania.

¹⁵ Excludes a negligible amount produced in Ecuador and Korea.

¹⁶ Excludes a negligible amount produced in Jamaica, Japan, Sarawak, Somali Republic, and Tanganyika.

¹⁷ Excludes Mexico and U.S.S.R.

¹⁸ Excludes Brazil.

¹⁹ Excludes West Germany.

²⁰ Excludes a negligible amount produced in Canada.

NOTE.—Statistical tabulations with minor exceptions are based on data available prior to August 1, 1964.

Table 7 groups these distribution data in a different way, to show the proportion of 1963 output of seven major minerals produced in the industrialized countries on the one hand, and the less industrialized countries on the other. In this table the industrialized countries include the United States and Canada, free Europe, Oceania and Japan, South Africa, and the U.S.S.R. and European Communist countries:

the less industrialized countries include the rest of the world. A significant point of the table is the very large proportion of total output of these minerals accounted for by the industrialized countries themselves, despite their growing need for additional supplies from the less industrialized countries.

The rapid growth of mineral output has required large investment in both mineral extraction and mineral processing facilities. Statistical data for mineral investments on a worldwide basis are fragmentary at best, but the available evidence indicates that in recent years free world petroleum investments have averaged about US\$10,700 million per year, while investments in the iron and steel industries of the three major industrialized areas (the United States, Western Europe, and Japan) appear to have ranged around US\$3,000 million annually in the past 5 years. Data for other mineral investments are too scanty to permit even rough estimates for the major areas. Investment in steel in the United Kingdom and European Coal and Steel Community (ECSC) is now (1964) tapering off. Data for Japan are lacking, but it has been estimated that about US\$2,700 million was invested in the Japanese iron and steel industry during 1955-62.⁸

For petroleum, the most complete coverage of investment is contained in the annual estimates prepared by the Petroleum Department of the Chase Manhattan Bank. According to these estimates, expenditures of the free world petroleum industry for expansion, modernization, and replacement of property, plant, and equipment (including the cost of dry holes but excluding exploration expenses) have averaged a little less than US\$10,800 million per year for the period 1958-62 inclusive. Of a total of US\$11,100 million in 1962, 51 percent was investment in production, about 14 percent in transportation (pipelines and marine), about 13 percent in refineries, about 14 percent in marketing facilities, and about 6 percent in chemical plants.

These estimates may be compared with the United States Department of Commerce figures for petroleum in its estimates of annual U.S. company expenditures for plant and equipment abroad, 1960-64 inclusive. These data exclude investments in petrochemical plants which are classified as a manufacturing industry. Investments in mining and smelting cannot be broken down according to the specific minerals involved because of the problem of revealing individual company data.

As presented in table 11, the financial assistance extended by five international lending agencies for investment in the mineral industries generally covers the mineral industries through the metal stage, and in the case of the steel and aluminum industries through the finished products normally regarded as products of the primary industry; in the chemical industry petrochemicals are excluded. The amounts reported in the table are gross of participations but net of cancellations.

⁸ Tokyo Foreign Service. Japan's Iron and Steel Industry. Tokyo, Japan, 1963, p. 132.

TABLE 6.—Approximate percentage distribution of world mineral production by major areas in 1963¹

	Western Hemisphere			Eastern Hemisphere						World		
	North and Central America	South America	Total	Europe		Africa	Middle East and Asia		Oceania	Total	Free	Cuba, Eastern Europe, Mainland China, Mongolia, North Korea, North Viet-Nam
				Free ²	Eastern ²		Free ²	Mainland China, Mongolia, North Korea, and North Viet-Nam				
Metals:												
Aluminum:												
Bauxite.....	31.9	19.3	51.2	16.2	18.8	5.8	5.5	1.3	1.2	48.8	79.9	20.1
Ingot.....	49.7	.5	50.2	19.6	21.4	1.0	5.2	1.8	.8	49.8	76.8	23.2
Antimony.....	11.0	14.8	25.8	6.4	14.5	21.4	5.0	26.8	.1	74.2	58.7	41.3
Arsenic, white ⁴	(⁵)	1.3	(⁵)	(⁵)	(⁵)	1.1	2.1	(⁵)	-----	(⁵)	100.0	(⁵)
Beryl.....	10.2	39.2	49.4	(⁷)	15.0	33.5	-----	-----	2.1	50.6	85.0	15.0
Bismuth.....	(⁵)	(⁵)	62.8	7.4	3.7	.3	15.6	10.2	-----	37.2	86.1	13.9
Cadmium.....	47.3	1.5	48.8	16.9	21.9	1.0	8.3	-----	3.1	51.2	78.1	21.9
Chromite.....	1.3	.4	1.7	2.7	38.0	29.4	27.0	.8	-----	4	59.9	40.1
Cobalt ⁴	(⁵)	-----	(⁵)	(⁵)	(⁵)	81.4	(⁵)	(⁵)	-----	(⁵)	100.0	(⁵)
Columbium-tantalum ⁴	25.3	18.5	43.8	4.0	(⁵)	50.1	1.8	(⁵)	-----	56.2	100.0	(⁵)
Copper:												
Mine.....	33.5	16.6	50.1	3.3	16.2	20.7	5.1	2.1	2.5	49.9	81.6	18.4
Smelter.....	31.6	14.4	46.0	9.5	15.7	19.0	5.8	2.2	1.8	54.0	82.1	17.9
Gold.....	11.5	1.8	13.3	.4	25.0	56.8	1.8	.4	2.3	86.7	74.6	25.4
Iron and steel:												
Iron ore.....	20.2	6.8	27.0	25.4	28.5	4.1	6.3	7.5	1.2	73.0	64.0	36.0
Pig iron (including ferroalloys).....	26.1	1.2	27.3	27.5	26.7	1.0	9.8	6.4	1.3	72.7	66.9	33.1
Steel ingots and castings.....	28.1	1.2	29.3	28.1	27.2	.8	10.0	3.4	1.2	70.7	69.4	30.6
Lead:												
Mine.....	24.0	8.2	32.2	13.7	20.4	7.4	4.0	5.9	16.4	67.8	73.7	26.3
Smelter.....	28.6	4.9	33.5	22.8	19.8	2.0	4.6	5.1	12.2	66.5	75.1	24.9
Magnesium.....	54.5	-----	54.5	20.5	22.7	-----	1.6	.7	-----	45.5	76.6	23.4
Manganese ore.....	1.8	9.6	11.4	.7	48.4	22.1	10.1	6.9	-----	88.6	44.2	55.8
Mercury.....	15.7	1.4	17.1	52.4	15.2	-----	4.3	11.0	-----	82.9	73.8	26.2
Molybdenum.....	72.1	8.7	80.8	.6	13.7	(⁷)	1.3	3.6	-----	19.2	82.7	17.3
Nickel.....	65.5	(⁷)	65.5	.8	24.4	.8	.1	-----	8.4	34.5	70.7	29.3
Platinum-group metals.....	25.7	1.9	27.6	-----	52.2	20.0	.2	-----	(⁷)	72.4	47.8	52.2
Selenium ⁴	67.2	.9	68.1	13.8	(⁵)	3.0	14.9	(⁵)	-----	31.9	100.0	(⁵)
Silver.....	45.4	18.4	63.8	6.6	13.8	2.6	5.0	.6	7.6	36.2	85.6	14.4
Tellurium ⁴	87.4	8.4	95.8	-----	(⁵)	-----	4.2	(⁵)	-----	4.2	100.0	(⁵)
Tin:												
Mine.....	(⁵)	(⁵)	13.7	1.1	11.0	10.2	47.7	14.7	1.6	86.3	74.3	25.7
Smelter.....	1.5	2.3	3.8	17.5	10.7	6.3	45.7	14.6	1.4	96.2	74.7	25.3

TABLE 7.—Mine production of major mineral commodities in percent of world total, by areas in 1963

Area	Iron ore	Bauxite	Copper	Lead	Zinc	Coal	Crude petroleum
Industrialized areas:							
Canada.....	5.3		8.8	7.1	12.5	0.4	2.7
United States.....	14.4	5.1	23.2	9.0	13.3	16.3	28.9
Free Europe.....	25.4	16.2	3.3	13.7	14.8	22.3	1.4
U.S.S.R.....	26.4	14.2	14.8	14.1	11.4	20.0	15.8
European Communist Countries except Yugoslavia ¹							
Japan.....	2.1	4.6	1.4	6.3	6.2	20.8	1.3
Oceania.....	.5		2.3	2.1	5.5	2.0	.1
South Africa, Republic of.....	1.2	1.2	2.5	16.4	9.9	1.8	(?)
	.9		1.2	(?)		1.6	
Total.....	76.2	41.3	57.5	68.7	73.6	85.2	50.2
Less industrialized areas:							
Latin America ²	7.3	46.1	18.1	16.1	12.8	0.4	16.4
Free Asia (except Japan).....	5.8	5.5	2.8	1.9	.8	3.4	28.2
China (mainland), North Korea, North Viet-Nam.....	7.5	1.3	2.1	5.9	5.9	10.9	.6
Africa (except Republic of South Africa).....	3.2	5.8	19.5	7.4	6.9	.1	4.6
Total.....	23.8	58.7	42.5	31.3	26.4	14.8	49.8

¹ Albania, Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, and Rumania.² Less than 0.1 percent.³ Includes Mexico, Caribbean, Central America, and South America.**TABLE 8.—Investments of the iron and steel industry in the United States, United Kingdom, and European Coal and Steel Community (ECSC)**
(Million U.S. dollars)

Year	United States ¹	United Kingdom ²	European Coal and Steel Community ³
1959.....	1,040	310	590
1960.....	1,600	470	760
1961.....	1,130	660	1,120
1962.....	1,100	550	1,220
1963.....	1,240	420	1,440

¹ Expenditures for new plant and equipment, primary iron and steel industry.² Gross fixed capital formation in iron and steel industry; amounts converted into dollars at rate of £1 = \$2.80.³ Investment expenditures of iron and steel industry.⁴ Estimate of British Iron and Steel Federation.⁵ Estimate.

Sources: U.S. Department of Commerce. Survey of Current Business. July 1963, March 1964; U.K. Central Statistical Office. National Income and Expenditure 1963; ECSC High Authority. Investment in the Community Coalmining and Iron and Steel Industries; British Iron and Steel Federation. Annual Report 1963.

TABLE 9.—Estimated capital expenditures of the free world petroleum industry
(Million U.S. dollars)

Year	United States	Other countries	Total free world	Percent of free world	
				United States	Other countries
1958.....	5,300	5,400	10,700	49.5	50.5
1959.....	5,275	5,775	11,050	47.7	52.3
1960.....	5,175	5,350	10,525	49.2	50.8
1961.....	5,100	5,325	10,425	48.9	51.1
1962.....	5,725	5,375	11,100	51.6	48.4

Source: Petroleum Department, Chase Manhattan Bank. Capital Investments by the World Petroleum Industry, November 1962.

TABLE 10.—U.S. direct investments in mineral industries in foreign countries, plant and equipment expenditures only

(Million U.S. dollars)

Area and/or country	1960		1961		1962		1963 ¹		1964 ¹	
	Min- ing and smelt- ing	Petro- leum	Min- ing and smelt- ing	Petro- leum	Min- ing and smelt- ing	Petro- leum	Min- ing and smelt- ing	Petro- leum	Min- ing and smelt- ing	Petro- leum
Canada.....	290	360	165	315	193	325	155	350	115	315
Latin America:										
South America.....	44	277	56	246	58	233	65	249	47	249
Other.....	10	20	8	21	5	24	5	27	5	23
Total.....	² 53	297	64	267	63	257	70	276	52	272
Other Western Hemisphere.....	24	44	23	39	32	62	30	39	38	38
Europe:										
EEC.....	(³)	145	(³)	186	(³)	269	(³)	386	(³)	303
Non-EEC:										
United Kingdom.....		100		170		125		110		95
Other.....	2	101	1	82	4	100	4	147	2	88
Total.....	2	² 200	1	252	4	225	4	257	2	183
Total, Europe.....	2	² 345	1	438	4	494	4	643	2	486
Africa:										
Northern Africa.....	(³)	75	(³)	111	(³)	137	(³)	161	(³)	134
Western Africa.....	16	23	22	34	43	11	32	9	24	8
Central and southern Africa.....	28	10	25	17	26	13	18	13	11	24
Total.....	44	⁴ 115	47	⁴ 171	69	⁴ 176	50	⁴ 202	35	⁴ 186
Middle East.....		76		87		72		162		109
Far East.....	(³)	101	(³)	108	1	106	1	169	(³)	171
Oceania:										
Australia.....	12	(³)	12	(³)	9	(³)	11	(³)	16	(³)
Other.....		(³)		(³)						
Total.....	12	66	12	64	9	76	11	68	16	45
International shipping.....		65		45		65		41		31
Grand total.....	² 426	² 1,467	312	1,534	371	1,633	321	1,950	258	1,653

¹ Estimated on basis of company projections.² Detail does not add to total shown due to rounding.³ Less than US\$500,000.⁴ Includes other Africa as follows: 1960—\$7 million, 1961—\$9 million, 1962—\$15 million, 1963—\$19 million, and 1964—\$20 million.⁵ Not reported separately, but included in Oceania area total.

Source: U.S. Department of Commerce. Survey of Current Business. September 1962, October 1963

Of the nearly US\$755 million of international financing for the iron and steel industry, US\$214.5 million was invested in Japan, US\$56.6 million in Spain, and US\$29.5 million in Mexico. Other large items under this heading were US\$66 million for iron ore mining in Mauritania and US\$40.5 million for the same purpose in Liberia. The bulk of the US\$136.89 million for aluminum consisted of a US\$110 million loan for the Volta project in Ghana, equally divided between the Export-Import Bank and Agency for International Development (AID).

TABLE 11.—Financing of mineral investments by selected international lending agencies in 1958–63¹

(Million U.S. dollars)

Commodity	International Bank for Reconstruction and Development (IBRD)	International Finance Corporation (IFC) ²	International Development Bank (IDB)	Agency for International Development (AID)	Export-Import Bank (EXIM) ³	Total
Iron and steel ⁴	226.0	9.36	-----	⁵ 156.50	⁶ 362.77	754.63
Fertilizer plants.....	-----	7.53	-----	64.50	33.89	155.97
Aluminum.....	-----	-----	-----	56.74	⁷ 80.15	136.89
Coal and coke.....	54.5	-----	-----	34.30	6.50	95.30
Petroleum and natural gas.....	50.0	-----	12.4	2.00	-----	64.40
Cement.....	-----	6.40	14.5	13.05	24.01	57.96
Copper.....	-----	-----	-----	4.40	49.23	53.63
Manganese.....	35.0	-----	-----	-----	-----	35.00
Potash.....	25.0	-----	-----	-----	-----	25.00
Tin.....	-----	-----	9.4	⁸ 8.50	-----	17.90
Phosphate.....	-----	-----	-----	1.50	3.50	5.00
Other ⁹	-----	2.40	13.0	9.60	9.79	34.79
Total.....	390.5	25.74	49.3	351.09	619.84	1,436.47

¹ January 1, 1958–December 31, 1963 except for AID, data for which cover July 1, 1957–December 31, 1963 (U.S. fiscal years 1958–64); gross of participations and loans sold but net of cancellations.

² Value of financing arrangements in which IFC has participated, and not the amounts of financial assistance it has extended from its own resources.

³ Excludes loans of less than \$100,000.

⁴ Includes iron ore mining and finished steel capacity.

⁵ Includes US\$18.4 million loan for development of railway and port facilities for export of Indian iron ore.

⁶ Excludes loans for iron and steel in ECSC countries in order to avoid overlap with data appearing in Table 8.

⁷ Excludes US\$55 million participation taken over by AID.

⁸ Includes supporting assistance loan of US\$3.5 million to Bolivia for tin production.

⁹ Includes production of ammonia and urea, salt, and soda ash, sodium carbonate, sodium sulfate, carbon black, sulfur, caustic soda-chlorine, refractory bricks, quarry equipment, and US\$2 million for a mineral resources survey.

Sources: International Bank for Reconstruction and Development. Statement of Loans, March 31, 1964; International Finance Corporation. Annual Report 1962–1963. Press releases; Agency for International Development. Operations Report Data as of June 30, 1963. Operations Report Data as of December 31, 1963; Export-Import Bank. Report to the Congress for the Twelve Months Ended June 30, 1963. V. II, Report to the Congress for the Six Months Ended December 31, 1963.

U.S. Department of Commerce estimates the value of United States direct investments in mineral industries outside the United States. In 1962 the earnings of the mining and smelting sector were about 11 percent of the book value, and its income about 10 percent of book value; in the case of the petroleum industry, earnings were about 13.6 percent and income about 12.5 percent. The total of mineral investments was 42.7 percent of all United States direct investments abroad in 1962.

Among the principal trends in mineral production shown by the statistical data for the period 1959–63 were the decline of iron ore and nonferrous ore production in Western Europe, the steady rise in output of the same commodities in Eastern Europe, the expansion of the steel industry in practically all regions, the rapid growth of iron ore production in Western Africa, South America, and Canada, and the growth and development of bauxite output in Western Africa, the Caribbean, and Australia. In the nonmetals, the most notable changes were the rapid growth of Canadian output of elemental sulfur (ob-

tained from natural gas) and of potash. In the fuels, the outstanding developments were the continuing rapid growth of petroleum production resulting from expansion of Middle Eastern output and the development of African production in Algeria, Libya, and Nigeria; the growth of natural gas output in Canada; and the discovery of large natural gas deposits in Northern Europe (still in the development stage). Production of uranium oxide declined steadily, affected by cutbacks of demand not yet offset by nuclear power requirements.

TABLE 12.—U.S. direct foreign investment in mineral industries; value, earnings, and income¹ in 1962

(Million U.S. dollars)

Area and country	Mining and smelting			Petroleum		
	Value ²	Earnings ³	Income ⁴	Value ²	Earnings ³	Income ⁴
Canada.....	1,482	91	53	2,834	121	90
Latin American Republics:						
South America:						
Venezuela.....	(⁵)	(⁵)	(⁵)	2,202	(⁵) 429	(⁵) 420
Other.....	(⁵)	(⁵)	(⁵)			
Total.....	928	128	125	2,914	472	446
Other.....	171	19	16	245	18	1
Total Latin American Republics.....	1,099	147	141	3,159	490	447
Other Western Hemisphere.....	176	83	79	485	62	42
Europe:						
EEC.....	9	(⁵)	(⁵)	1,083	57	45
Non-EEC:						
United Kingdom.....	(⁵)			790	(⁵) 20	(⁵) 24
Other.....	(⁵)	(⁵)	(⁵)			
Total.....	40	(⁵)	(⁵)	1,282	15	21
Total Europe.....	49	5	7	2,365	72	66
Africa:						
Northern Africa.....	4	1	(⁵)	338	-1	-2
Western Africa.....	170	10	11	99	-23	-24
Central and Southern Africa.....	133	23	16	135	20	(⁵)
Eastern Africa.....	1	(⁵)	(⁵)	54	-1	+2
Total.....	7 307	34	7 28	7 627	7 -6	7 -23
Middle East.....	(⁵)			1,148	845	846
Far East.....	29	2	1	612	86	94
Oceania:						
Australia.....	42	5	(⁵) 4	(⁵)	(⁵)	(⁵)
Other.....	-1	-1	(⁵)	(⁵)	(⁵)	(⁵)
Total.....	41	4	4	462	4	-6
International shipping ⁶				968	43	23
Grand total ⁷	3,183	7 367	7 314	7 12,661	7 1,716	7 1,578

¹ Preliminary figure.

² Book value.

³ U.S. share in net earnings of subsidiaries and branch profits.

⁴ Sum of dividends, interest, and branch profits.

⁵ Not reported separately from other industry in sources, included in area total.

⁶ Less than US\$500,000.

⁷ Detail does not add to total shown due to rounding.

⁸ Petroleum investments in shipping.

Source: U.S. Department of Commerce. Survey of Current Business. August 1963

The economic trend of major importance was the growth of mineral import demands in the expanding economies of Western Europe and Japan. A subsidiary trend was the growth in developing less industrialized countries of mineral consuming and fabricating industries, often stimulated by nationalist economic policies, which may foreshadow their increasing share in the consumption of total mineral output. A constant factor throughout the period was the existence of political instability in many mineral producing regions.

The rapid world expansion of the iron and steel industry has had much to do with the development of new mineral production. The industry is undergoing a far reaching technological evolution involving conversion to the oxygen, fuel injection, and other new processes. The industrialized areas are shifting the use of higher grade ores imported from the less industrialized countries. This not only develops new production and increases world mineral trade but also, for cost reasons, creates a tendency toward concentration of new plants in coastal regions accessible to sea transport, and toward a greater degree of beneficiation of ores at the mines, even in the case of the high-grade imported ores, in order to save transport costs. Technological developments tend, for technical reasons connected with the new oxygen processes, to increase the proportion of iron ore in total raw material consumption.

In the fuel sector, the principal technological development has been the rapid rise of petroleum and natural gas-based fertilizer and chemical industries. This has been accompanied by a trend, both for economic reasons and in order to meet nationalistic political pressures, toward market oriented refineries, often requiring design improvements to make smaller units more economical. A second technological development has been the adoption of techniques for transporting natural gas by tanker, making possible the marketing of petroleum derived and other gases produced in regions remote from potential markets. A third technological change has occurred in the field of nuclear power, where the development of very large reactor units (upward of 500 megawatts) and the standardization of designs has brought uranium-fueled nuclear power within competitive range of fossil fuels in some locations.⁹

In the field of the nonmetals, techniques have been devised for the transport of molten sulfur by tanker, a development analogous to the transport of gas by tanker.

Tables 13 through 28 show production of a number of major commodities for the years 1959-63, listing major world producers and total world output. Commodities covered include bauxite, aluminum, copper, iron ore, steel ingots and castings, lead, tin, zinc, cement, phosphate rock, potash, sulfur (two tables, one covering elemental sulfur, the other covering pyrites), coal, and crude oil.

⁹ The Economist, Apr. 18, 1964, pp. 289-290. Nucleonics, March 1964, v. 22, No. 3, pp. 17-18.

TABLE 13.—Leading world producers of bauxite¹

(Thousand metric tons)

Country	1959 ²	1960	1961	1962	1963
Jamaica.....	5,208	5,837	6,770	7,615	7,014
U.S.S.R. ^{3,4}	3,000	3,500	4,000	4,200	4,300
Surinam.....	3,430	3,455	3,405	3,253	3,482
British Guiana.....	1,701	2,511	2,412	* 2,730	* 2,247
France.....	1,757	2,067	2,224	2,158	2,003
United States.....	1,728	2,030	1,248	1,391	1,549
Guinea, Republic of.....	301	1,190	1,767	* 1,440	* 1,500
Hungary.....	938	1,190	1,366	1,473	1,362
Greece.....	918	884	1,120	1,321	* 1,300
Yugoslavia.....	815	1,025	1,232	1,332	1,285
Total.....	19,796	23,689	25,544	26,913	26,042
All other producers ⁵	3,204	3,701	3,736	4,027	4,198
World total ⁶	23,000	27,390	29,280	30,940	30,240

¹ Data presented conform with that given in world production table in commodity chapter, volume 1. In some cases, revised figures for individual countries have been incorporated in country chapters of volume IV.

² The Dominican Republic, with an output of 771,000 tons, ranked 10th ahead of the Republic of Guinea.

³ Estimate.

⁴ Excludes nepheline concentrates and alunite ores.

⁵ Derived figure; difference between indicated world total and sum of output of individually listed producers.

TABLE 14.—Leading world producers of aluminum¹

(Thousand metric tons)

Country	1959	1960	1961	1962	1963
United States.....	1,773	1,828	1,727	1,921	2,098
U.S.S.R. ²	625	675	900	910	960
Canada.....	539	691	602	626	653
France.....	173	238	279	295	293
Japan.....	100	133	154	171	224
Norway.....	146	165	172	206	219
Germany, West.....	151	169	173	178	209
China (mainland) ³	70	80	100	100	100
Italy.....	75	84	83	81	91
Austria.....	66	68	68	74	76
Total.....	3,718	4,131	4,258	4,562	4,928
All others ⁴	342	399	487	518	602
World total ⁵	4,060	4,530	4,725	5,080	5,530

¹ Data presented conform with that given in world production table in commodity chapter, volume 1. In some cases, revised figures for individual countries have been incorporated in country chapters of volume IV.

² Estimate.

³ Derived figure; difference between indicated world total and sum of output of individually listed producers.

TABLE 15.—Leading world mine producers of copper¹
(Copper content of ore, recoverable where indicated, thousand metric tons)

Country	1959 ²	1960	1961	1962	1963
United States ³	748	980	1,057	1,114	1,101
U.S.S.R. ^{2,4}	435	500	550	650	700
Chile.....	546	536	551	593	601
Northern Rhodesia.....	543	576	574	562	538
Canada ⁵	359	398	398	415	416
Congo, Republic of the (Leopoldville) ⁶	282	302	295	295	270
Peru.....	50	182	198	167	177
Australia.....	96	111	97	112	116
Japan.....	85	89	96	104	107
China (mainland) ⁴	50	70	80	90	90
Total.....	3,194	3,744	3,896	4,102	4,166
All others ⁷	476	476	504	518	574
World total ⁸	3,670	4,220	4,400	4,620	4,740

¹ Data presented conform with that given in world production table in commodity chapter, volume 1. In some cases, revised figures for individual countries have been incorporated in country chapters of volume IV. ² Mexico, with an output of 58,000 tons, ranked ninth, ahead of Peru and mainland China.

³ Recoverable.

⁴ Estimate.

⁵ Smelter output.

⁶ Derived figure; difference between indicated world total and sum of output of individually listed producers.

TABLE 16.—Leading world producers of iron ore, iron ore concentrates, and iron ore agglomerates¹

(Thousand metric tons)

Country	1959 ²	1960 ³	1961 ⁴	1962 ⁴	1963
U.S.S.R. ⁵	94,015	105,857	117,633	128,102	136,800
United States ⁶	61,243	90,209	72,474	72,982	74,780
France.....	60,938	66,964	66,606	66,301	57,885
China (mainland) ^{7,8}	45,000	55,000	35,000	30,000	35,000
Canada.....	22,215	19,550	18,469	24,820	27,338
Sweden.....	18,351	21,690	23,593	22,023	23,631
United Kingdom.....	15,109	17,362	16,783	15,522	15,151
India ⁹	7,982	10,683	12,270	13,362	14,926
Germany, West.....	18,063	18,869	18,866	16,643	12,898
Brazil.....	8,907	9,345	10,220	10,778	12,000
Venezuela.....	17,201	19,490	14,565	13,266	11,863
Chile.....	4,649	6,041	6,989	8,092	8,507
Malaya.....	3,821	5,731	6,842	6,612	7,381
Luxembourg.....	6,509	6,977	7,458	6,507	6,990
Liberia.....	2,689	3,051	3,251	3,607	6,557
Total.....	386,692	456,819	431,019	438,617	451,707
All others ¹⁰	52,352	65,419	71,622	68,747	70,189
World total ⁷	439,044	522,238	502,641	507,364	521,896

¹ Data presented conform with that given in world production table in commodity chapter, volume 1. In some cases, revised figures for individual countries have been incorporated in country chapters of volume IV.

² Spain, with 4,609,000 tons and Australia with 4,207,000 tons ranked 14th and 15th, respectively.

³ Peru with 6,990,000 tons and Goa with 5,856,000 tons ranked 12th and 15th, respectively.

⁴ Peru, with 8,737,000 tons in 1961 and 5,949,000 tons in 1962 ranked 12th and 15th in those years, respectively.

⁵ Data represents concentrates containing approximately 60 percent iron.

⁶ Includes byproduct ores.

⁷ Estimate.

⁸ Roughly equivalent to ore containing 50 percent iron.

⁹ Excludes the output of Goa.

¹⁰ Derived figure; difference between indicated world total and sum of output of individually listed producers.

TABLE 17.—Leading world producers of steel ingots and castings¹

(Thousand metric tons)

Country	1959 ²	1960 ²	1961	1962	1963
United States ³	84,772	90,066	88,917	89,201	99,119
U.S.S.R. ³	59,971	65,293	70,751	76,300	80,220
Germany, West (including Saar).....	29,435	34,100	33,468	32,563	31,697
Japan.....	16,629	22,138	28,268	27,546	31,501
United Kingdom.....	20,511	24,695	22,441	20,820	22,881
France.....	15,075	17,152	17,428	17,240	17,557
China (mainland) ³	4 13,350	4 18,450	9,500	10,000	12,000
Italy.....	6,762	8,229	9,329	9,757	10,156
Poland.....	6,160	6,881	7,234	7,684	8,004
Czechoslovakia.....	6,136	6,768	7,043	7,639	7,598
Total.....	258,801	293,772	294,369	298,750	320,633
All others ⁴	46,469	52,378	56,491	60,750	65,397
World total ⁵	305,270	346,150	350,860	359,500	386,030

¹ Data presented conform with that given in world production table in commodity chapter, volume 1. In some cases, revised figures for individual countries have been incorporated in country chapters of volume IV.

² Belgium, with a 1959 output of 6,437,000 tons and a 1960 output of 7,188 tons ranked ninth in each of those years.

³ Data from American Iron and Steel Institute. Excludes production of castings by companies that do not produce steel ingots.

⁴ Claimed figures. Data appear to be exaggerated by one fifth or more.

⁵ Estimate.

⁶ Derived figure; difference between indicated world total and sum of output of individually listed producers.

TABLE 18.—Leading world mine producers of lead¹

(Lead content of ore, recoverable where indicated, thousand metric tons)

Country	1959 ²	1960	1961	1962	1963
Australia.....	321	313	274	376	416
U.S.S.R. ³	320	325	360	360	360
United States ⁴	232	224	238	215	230
Mexico.....	191	191	181	193	190
Canada.....	169	187	166	192	181
Peru.....	4 115	4 132	4 136	4 128	143
Yugoslavia.....	92	91	97	102	102
China (mainland) ⁵	70	80	90	90	100
Bulgaria.....	80	84	80	94	89
Morocco.....	92	95	88	90	73
Total.....	1,682	1,722	1,710	1,840	1,889
All others ⁶	648	668	680	670	661
World total ⁶	2,330	2,390	2,390	2,510	2,550

¹ Data presented conform with that given in world production table in commodity chapter, volume 1. In some cases, revised figures for individual countries have been incorporated in country chapters of volume IV.

² South-West Africa, with an output of 70,353 tons, ranked 10th, ahead of China (mainland).

³ Estimate.

⁴ Recoverable.

⁵ Derived figure; difference between indicated world total and sum of output of individually listed countries.

TABLE 19.—Leading world producers of manganese ore¹

(Thousand metric tons)

Country	Percent Mn ²	1959 ³	1960 ³	1961 ³	1962 ⁴	1963
U.S.S.R.-----	(⁵)	5,516	5,872	5,972	6,402	6,700
South Africa, Republic of-----	30+	970	1,194	1,418	1,465	1,308
Brazil-----	38-50	1,033	999	1,016	1,171	1,200
India ⁶ -----	35+	1,178	1,199	1,230	1,186	1,075
China (mainland) ² -----	30+	1,000	1,200	800	800	1,000
Gabon-----	50-82				203	637
Ghana (exports dry weight)-----	48	524	545	391	466	394
Morocco-----	35-50	471	483	571	469	335
Congo, Republic of the (Leopoldville)-----	48	386	382	318	299	316
Japan-----	32-40	348	324	304	309	277
Total-----	(⁵)	11,426	12,198	12,020	12,770	13,242
All others ⁷ -----	(⁵)	1,526	1,376	1,513	1,532	1,358
World total ³ -----	(⁵)	12,952	13,574	13,533	14,302	14,600

¹ Data presented conform with that given in world production table in commodity chapter, volume 1. In some cases, revised figures for individual countries have been incorporated in country chapters of volume IV.

² Estimate.

³ Rumania, with an output of 197,000 tons in 1959, 175,000 tons in 1960, and 206,000 tons in 1961 ranked 10th.

⁴ British Guiana, with an output of 275,000 tons ranked 10th, ahead of Gabon.

⁵ Data not available.

⁶ Excludes output of Goa.

⁷ Derived figure; difference between indicated world total and sum of output of individually listed producers.

TABLE 20.—Leading world mine producers of tin¹

(Tin content of ore, long tons)

Country	1959	1960 ²	1961 ³	1962 ³	1963
Malaysia-----	37,525	51,979	56,028	58,603	59,947
China (mainland) ⁴ -----	26,000	28,000	30,000	23,000	28,000
Bolivia (exports)-----	23,811	19,407	20,408	21,492	22,752
U.S.S.R. ⁴ -----	15,000	16,000	17,000	17,000	20,000
Thailand-----	9,684	12,080	13,270	14,679	15,587
Indonesia-----	21,613	22,596	18,574	17,310	12,947
Nigeria-----	5,541	7,675	7,779	8,210	8,723
Congo, Republic of the (Leopoldville)-----	9,194	8,636	6,314	6,875	7,196
Australia-----	2,351	2,202	2,745	2,714	3,085
South Africa-----	1,273	1,276	1,430	1,408	1,530
Total-----	151,992	169,851	173,548	176,291	179,767
All others ⁵ -----	9,508	10,549	10,552	10,709	11,233
World total ⁵ -----	161,500	180,400	184,100	187,000	191,000

¹ Data presented conform with that given in world production table in commodity chapter, volume 1. In some cases, figures for individual countries have been incorporated in country chapters of volume IV.

² Brazilian output, estimated at 1,556 tons exceeded reported output of South Africa, ranking Brazil 10th.

³ Output of Ruanda-Urundi (1,474 tons in 1961 and an estimated 1,440 tons in 1962) exceeded that of South Africa ranking Ruanda-Urundi 10th.

⁴ Estimated smelter output.

⁵ Estimate.

⁶ Derived figure; difference between indicated world total and sum of output of individually listed producers.

TABLE 21.—Leading world mine producers of zinc¹

(Zinc content of ore, recoverable where indicated, thousand metric tons)

Country	1959 ²	1960 ³	1961 ⁴	1962 ⁴	1963
United States ⁵	386	395	421	459	480
Canada.....	359	369	402	455	451
U.S.S.R. ⁶	335	345	400	410	410
Australia.....	280	323	316	343	358
Mexico.....	264	262	269	251	241
Japan.....	142	157	168	192	198
Peru ¹	143	178	174	162	181
Poland.....	129	144	140	145	147
Korea, North ⁶	85	85	90	90	110
Italy.....	133	131	134	132	107
Total.....	2,256	2,389	2,514	2,639	2,683
All others ⁷	864	931	946	891	922
World total ⁸	3,120	3,320	3,460	3,530	3,605

¹ Data presented conform with that given in the world production table in commodity chapter, volume 1. In some cases, revised figures for individual countries have been incorporated in country chapters of volume IV.

² Spain, with an output of 86,000 tons, ranked 10th.

³ The Republic of the Congo (Leopoldville), with an output of 109,000 tons, ranked 10th.

⁴ Mainland China, with an estimated output of 100,000 tons in both 1961 and 1962, ranked 10th.

⁵ Recoverable.

⁶ Estimate.

⁷ Derived figure; differences between indicated world total and sum of output of individually listed producers.

TABLE 22.—Leading world producers of hydraulic cement¹

(Thousand metric tons)

Country	1959 ²	1960	1961	1962	1963
United States.....	60,670	56,986	57,753	60,022	62,832
U.S.S.R.....	38,784	45,520	51,000	57,300	61,000
Japan.....	17,288	22,538	24,636	28,787	29,948
Germany, West.....	23,164	24,905	27,144	28,593	29,217
Italy.....	14,402	16,014	18,031	20,172	22,088
United Kingdom.....	12,790	13,497	14,376	14,256	14,000
India.....	6,936	7,835	8,244	8,586	9,355
China (mainland).....	12,270	13,500	8,000	8,000	9,000
Poland.....	5,317	6,592	7,364	7,544	7,670
Spain.....	5,729	5,733	6,628	7,294	7,145
Total.....	197,330	213,120	223,176	240,554	252,255
All others ⁴	97,082	103,417	110,252	117,287	123,157
World total ³	294,412	316,537	333,428	357,841	375,412

¹ Data presented conform with that given in world production table in commodity chapter, volume 1. In some cases, revised figures for individual countries have been incorporated in country chapters of volume IV.

² Canada with an output of 5,701,000 metric tons ranked 10th.

³ Estimate.

⁴ Derived figure; difference between indicated world total and sum of output of individually listed producers.

TABLE 23.—Leading world phosphate rock producers¹

(Thousand metric tons)

Country	1959 ²	1960 ³	1961 ⁴	1962 ⁴	1963
United States.....	16,124	17,787	18,857	19,692	20,154
U.S.S.R. ⁴	6,100	7,100	8,800	10,000	11,100
Morocco.....	7,164	7,472	7,950	8,162	8,548
Tunisia.....	2,185	2,096	1,982	2,097	2,367
Nauru Island (exports).....	1,211	1,373	1,308	1,540	1,572
Viet-Nam, North.....	811	541	622	712	800
China (mainland) ⁵	500	600	500	600	700
Christmas Island (exports).....	502	512	705	529	662
United Arab Republic.....	629	566	627	602	612
Senegal.....	95	212	546	638	595
Total.....	34,821	38,259	41,892	44,572	47,110
All other ⁷	3,554	3,641	3,583	3,628	4,090
World total ⁸	38,375	41,900	45,475	48,200	51,200

¹ Includes output of all major crude mineral sources of phosphate, including apatite, guano, and similar materials. Data presented conform with that given in world production table in commodity chapter, volume 1. In some cases, revised figures for individual countries have been incorporated in country chapters of volume IV.

² Brazil with an output of 1,006,000 tons ranked sixth; Algeria with an output of 572,000 tons ranked eighth.

³ Brazil with an output of 880,000 tons ranked sixth; Algeria with an output of 563,000 tons ranked ninth.

⁴ Brazil with an output of 659,000 tons in 1961 and 566,000 tons in 1962 ranked 7th and 10th respectively, in those years.

⁵ Estimate.

⁶ Includes a category of material described by the Russians as "sedimentary rock."

⁷ Derived figure; difference between indicated world total and sum of output of individually listed producers.

TABLE 24.—Leading world producers of marketable potash¹(Thousand metric tons, K₂O equivalent)

Country	1959	1960	1961	1962	1963
United States.....	2,162	2,394	2,479	2,225	2,600
Germany, West.....	1,835	1,979	2,044	1,940	1,920
Germany, East.....	1,600	1,665	1,675	1,752	1,800
France.....	1,462	1,532	1,710	1,722	1,722
U.S.S.R. ²	1,050	1,100	1,322	1,500	1,700
Total.....	8,109	8,670	9,230	9,139	9,742
All other ³	391	430	470	661	1,158
World total ³	8,500	9,100	9,700	9,800	10,900

¹ Data presented conform with that given in world production table in commodity chapter, volume 1. In some cases, revised figures for individual countries have been incorporated in country chapters of volume IV.

² Estimate.

³ Derived figure; difference between indicated world total and sum of output of individually listed producers.

TABLE 25.—Leading world pyrite¹ producers

(Gross weight, thousand metric tons)

Country	1959 ²	1960 ²	1961 ²	1962	1963
Japan.....	3,390	3,692	3,931	4,015	³ 4,000
U.S.S.R. ²	2,600	2,800	2,800	3,000	3,200
Spain.....	2,120	2,253	2,131	2,129	2,005
Italy.....	1,518	1,546	1,580	1,585	1,399
China (mainland) ²	850	1,000	1,000	1,100	1,200
Cyprus.....	884	929	837	822	³ 900
United States.....	1,074	1,033	1,003	931	838
Norway.....	744	833	733	793	711
Portugal.....	632	655	653	641	605
Finland.....	263	260	274	475	538
Total.....	14,075	15,001	14,942	15,491	15,396
All others ⁴	4,825	5,099	4,658	4,609	4,604
World total ⁵	18,900	20,100	19,600	20,100	20,000

¹ Includes cupreous pyrites. Data presented conform to that given in world production table in commodity chapter, volume 1. In some cases, revised figures for individual countries have been incorporated in country chapters of volume IV.

² Canada with an output of 993,000 tons in 1959, 936,000 tons in 1960, and 469,000 tons in 1961 ranked 6th, 7th, and 10th, respectively, in those years.

³ Estimate.

⁴ Derived figure; difference between indicated world total and sum of output of individually listed producers.

TABLE 26.—Leading world elemental sulfur producers¹

(Thousand metric tons)

Country	1959 ²	1960 ²	1961	1962	1963
United States.....	5,412	5,897	6,437	6,020	5,922
Mexico.....	³ 1,378	³ 1,334	1,244	1,447	1,553
France.....	426	791	1,097	1,347	1,418
U.S.S.R. ²	780	1,010	1,175	1,320	1,350
Canada (sales).....	132	249	358	631	1,054
Poland.....	11	25	231	342	308
China (mainland) ²	200	240	240	240	240
Japan.....	227	256	251	233	233
Germany, East.....	108	102	117	120	³ 120
Germany, West.....	80	84	84	91	³ 86
Total.....	8,754	9,988	11,234	11,791	12,284
All others ⁴	516	532	506	469	441
World total ⁵	9,270	10,520	11,740	12,260	12,725

¹ Includes Frasch-process sulfur, sulfur from sulfur ores, and byproduct sulfur from other ores, natural gas, oil refinery gas, and from oil shale. Data presented conform with that given in world production table in commodity chapter, volume 1. In some cases, revised figures for individual countries have been incorporated in country chapters of volume IV.

² Italy, with a production of 122,000 tons in 1959 and 86,000 tons in 1960 ranked eighth and ninth, respectively, in those years.

³ Estimate.

⁴ Derived figure; difference between indicated world total and sum of output of individually listed producers.

TABLE 27.—Leading world producers of coal (all grades)¹

(Million metric tons)

Country	1959	1960	1961	1962	1963	Remarks
U.S.S.R.....	507	513	511	517	530	26 percent of 1963 total was lignite.
United States.....	393	394	381	398	433	0.6 percent of 1963 total was lignite.
China (mainland) ²	348	420	250	250	270	Not reported distributed by grade, but known to include virtually no lignite.
Germany, East.....	218	228	240	250	257	1.2 percent of 1963 total was lignite.
Germany, West.....	238	241	243	245	251	42.6 percent of 1963 total was lignite.
United Kingdom.....	209	197	194	201	199	No lignite.
Poland.....	108	114	117	121	128	11.9 percent of 1963 total was lignite.
Czechoslovakia.....	79	85	92	97	102	72.1 percent of 1963 total was lignite.
India.....	48	53	56	62	67	1.5 percent of 1963 total was lignite.
Japan.....	49	52	56	56	53	1.7 percent of 1963 total was lignite.
France.....	60	58	55	55	48	5.1 percent of 1963 total was lignite.
Australia.....	34	38	41	42	44	43.2 percent of 1963 total was lignite.
South Africa (marketable).....	36	38	40	41	42	No lignite.
Hungary.....	25	27	28	29	30	87.8 percent of 1963 total was lignite.
Yugoslavia.....	21	24	24	25	27	95.3 percent of 1964 total was lignite.
Belgium.....	23	22	22	21	21	No lignite.
Total:						
Lignite.....	574	594	615	633	668	
Bituminous and anthracite (by subtraction).....	1,822	1,910	1,735	1,777	1,834	
All grades.....	2,396	2,504	2,350	2,410	2,502	
All others:³						
Lignite.....	43	45	47	52	54	
Bituminous and anthracite (by subtraction).....	80	84	85	87	96	
All grades.....	123	129	132	139	150	
World total:						
Lignite.....	617	639	662	685	722	
Bituminous and anthracite (by subtraction).....	1,902	1,994	1,820	1,864	1,930	
All grades ²	2,519	2,633	2,482	2,549	2,652	

¹ Data presented conform with that given in world production table in commodity chapter, volume II. In some cases, revised figures for individual countries have been incorporated in individual country chapters of volume IV.

² Estimate.

³ Derived figures, difference between indicated world total and sum of output of individually listed producers.

TABLE 28.—Leading world crude oil producers¹

(Million 42-gallon barrels)

Country	1959 ²	1960 ²	1961 ³	1962 ³	1963
United States	2,575	2,575	2,622	2,676	2,753
U. S. S. R. ⁴	946	1,079	1,212	1,360	1,504
Venezuela	1,011	1,042	1,066	1,168	1,186
Kuwait ⁵	505	594	600	669	705
Saudi Arabia ⁵	400	456	508	555	595
Iran	345	386	432	482	538
Iraq	311	354	366	367	423
Canada	185	190	221	244	258
Algeria	10	67	121	158	153
Libya				67	168
Indonesia	139	153	155	168	165
Mexico	96	99	107	112	116
Kuwait-Saudi Arabia Neutral Zone	42	50	65	89	115
Argentina	45	64	84	98	87
Rumania	83	86	86	88	91
Total	6,693	7,195	7,652	8,301	8,896
All others ⁶	452	495	532	581	639
World total ⁴	7,145	7,690	8,184	8,882	9,535

¹ Data presented conform with that given in world production table in commodity chapter, volume II. In some cases, revised figures for individual countries have been incorporated in country chapters of volume IV.

² Qatar, with an output of 61 million barrels in 1959 and 63 million barrels in 1960 ranked 12th and 14th, respectively, and Colombia, with an output of 64 million barrels in 1959 and 56 million barrels in 1960 ranked 13th and 15th, respectively, in the years noted.

³ Qatar, with an output of 64 million barrels in 1961 and 68 million barrels in 1962 ranked 15th in each year.

⁴ Estimate.

⁵ Excluding output from Kuwait-Saudi Arabia Neutral Zone, which is listed separately.

⁶ Derived figure; difference between indicated world total and sum of output of individually listed producers above.

TRENDS IN METAL CONSUMPTION AND TRADE

The continuing high level of world industrial production resulted in a substantial increase in the use of most mineral products in 1963. Consumption of aluminum rose about 8 percent, of copper about 5.5 percent, of iron ore substantially, that of lead about 4.5 percent, of zinc about 6 percent, of sulfur more than 6 percent, and of petroleum about 6 percent. Tin consumption increased only marginally.¹⁰

Iron ore consumption in the United States rose about 8 percent above 1962 levels, and steel consumption increased by 7 percent.¹¹ Increased consumption of both minerals also occurred in Japan and the United Kingdom, while consumption in the EEC remained at about the 1962 level. Estimates of the American Bureau of Metal Statistics, the International Lead and Zinc Study Group, and the International Tin Council for changes in consumption of the five major nonferrous metals indicate that aluminum consumption increased more rapidly during 1961-63 than consumption of any of the other four.

With rising consumption, stocks of major minerals in the hands of producers were drawn down in 1963, inventories of consumers tending to rise. Total copper stocks declined only slightly, a sharp decrease

¹⁰ American Bureau of Metal Statistics. Year Book. (Forty-third Annual Issue for the Year 1963). Pp. 13-118. Engineering and Mining Journal. V. 163, No. 2, February 1964, pp. 90-155, 160.

International Lead and Zinc Study Group. Lead and Zinc Statistics. V. 4, No. 5, May 1964, 28 pp.

International Tin Council. Statistical Bulletin, v. 8, No. 5, May 1964, 44 pp.

World Petroleum. V. 35, No. 1, January 1964, pp. 28-29.

¹¹ U. S. Department of Commerce. Survey of Current Business. February 1964, pp. 3-4; March 1964, p. S-32.

in the United States being almost offset by a substantial rise elsewhere. Producers' stocks of refined lead rose slightly in Europe but were sharply reduced in the United States and elsewhere, while stocks of refined zinc in producers' hands were reduced by about 46 percent, with sharp reductions in both the United States and Europe. Stocks of tin metal (primary and secondary) outside government stockpiles were reduced by 4,500 tons. The buffer stock of the International Tin Council was again exhausted in the autumn of 1963.

In terms of value, readily available data, even for 1962, are incomplete but United Nations analyses covering the major categories of mineral exports give an idea of trends. The evidence indicates that world exports of metalliferous ores, metal scrap, metals, and mineral fuels, as an aggregate, maintained a steady ratio of about 21 to 22 percent of total world exports during 1958-62, keeping pace with the rapid expansion of world trade as a whole. The data do not cover the precious metals or the nonmetallic minerals, and include manufactured metals (for example, steel) but not fabricated metal products.

In the 5-year period this group of mineral exports increased by 22.6 percent in value, with mineral fuels showing a steady rise after 1959 and ores and metals showing a more erratic trend. The sharp rise to higher levels in all three categories beginning in 1960 is noteworthy. The mineral fuels accounted for roughly half the total value and appear to have accounted for approximately 10 percent of total world exports.

TABLE 29.—Estimated world consumption of major nonferrous metals

Commodity	1961	1962	1963
Aluminum ¹thousand metric tons..	4,392	4,892	5,286
Copper ²do.....	4,596	4,571	4,822
Lead ³do.....	2,292	2,376	4,483
Tin ⁴thousand long tons..	153	158	161
Zinc ⁵thousand metric tons..	2,586	2,704	4,852

¹ American Bureau of Metal Statistics. Year Book (Forty-third Annual Issue for the Year 1963); partial.

² American Bureau of Metal Statistics; world total.

³ International Lead and Zinc Study Group. Lead and Zinc Statistics. V. 4, No. 5, May 1964; excluding European and Asian Communist countries.

⁴ Estimate.

⁵ International Tin Council. Statistical Bulletin. May 1964; excluding European and Asian Communist countries.

TABLE 30.—Changes in world stocks of nonferrous metals

Metal	End 1962	End 1963	Change
Copper ¹thousand metric tons..	432.1	427.4	-4.7
Lead ²do.....	280.8	186.4	-94.3
Tin ³thousand long tons..	50.3	45.8	-4.5
Zinc ³thousand metric tons..	262.4	149.7	-112.7

¹ American Bureau of Metal Statistics. Year Book (Forty-third Annual Issue for the Year 1963). Pp. 16-17.

² International Lead and Zinc Study Group. Lead and Zinc Statistics. V. 4, No. 5, May 1964; producers' stocks.

³ International Tin Council. Statistical Bulletin. May 1964; primary and secondary tin; stocks in hands of producers, consumers, dealers at official warehouses, and in transit.

TABLE 31.—World exports of major classes of minerals, by value ¹

(Million U.S. dollars)

Class	1958	1959	1960	1961	1962
Metalliferous ores and metal scrap (SITC Revised, 28) ..	2,960	3,300	3,870	3,850	3,450
Metals ² (SITC Revised, 67, 68 less 681)	8,660	9,390	11,430	11,240	11,330
Mineral fuels and related materials (SITC Section 3) ..	12,260	12,030	12,650	13,480	14,490
Totals	23,880	24,720	27,950	28,570	29,270
Total world exports	107,510	114,940	127,400	133,040	140,580
Percentage of world total	22	22	22	21	21

¹ United Nations Monthly Bulletin of Statistics. April 1964, Special Table B; March 1964, Special Table C.III.C. Categories used are those of the Standard Industrial Trade Classification (SITC).

² Excludes precious metals.

About two-thirds of total world exports of these commodities were taken by the three major free world industrialized areas. In 1962 North America took 17 percent of the total, Western Europe 45 percent, and Japan 4.6 percent. A significant trend has been the growing import share of Western Europe in the total; from 1959 to 1962 its import share of exports of metallic ores and scrap rose from 36 percent to 41 percent, of metals from 44 percent to 48 percent, and of mineral fuels from 40 percent to 44 percent. Japan's share similarly rose but at a much lower level. Concurrently there has been, proportionately, a shift of mineral exports from United States to European destinations, particularly marked in the case of Latin America; Western Europe's share of Latin American mineral exports rose from 20.7 percent to 25.3 percent in the period, and Japan's share from 0.3 percent to 2.5 percent.

The European Communist countries' exports of the group of mineral commodities have also grown rapidly, but are concentrated chiefly on destinations within the countries themselves. Its other principal trading partner, Western Europe, took only 19 percent of these mineral exports in 1962 as compared with 20 percent in 1958, and the increase in the value of Eastern Europe's mineral exports to Western Europe amounted to slightly less than US\$200 million during the period.

UN data for 1962 trade, in the form of a network or matrix table, bring out the strong influence of transport costs and geographical proximity on trade flows of mineral commodities. They show the existence of a Europe-Africa-Middle East mineral trade area, a Japan-Far East-Pacific trade area, and a hemispheric North America-Latin America trade area. At the same time it shows both Japan and Europe reaching into Latin America for additional supplies, and data for previous years would show this trade increasing.

A high proportion of trade in the industrialized regions consists of intraregional trade; about 39 percent of North America's mineral imports originated in North America, and 49 percent of Western Europe's mineral trade originated in Western Europe. Much of this intraregional trade in the two areas consists of coal and metals, a large part of the latter probably products of the steel industry.

TABLE 32.—World exports of major classes of minerals in 1962, by value and region ¹

(Million U.S. dollars)

Exporters	Destinations										
	North America	Latin America	Western Europe	Middle East ²	Australia, New Zealand, South Africa	Central Africa ³	Japan	Other free Asia	Eastern Europe ⁴	China (mainland), etc. ⁵	Other ⁶
North America.....	1,490	270	1,200	40	80	30	340	270	10		20
Latin America.....	1,550	280	920	(?)	10	20	90	10	10		730
Western Europe.....	570	250	6,380	280	110	170	50	240	570	10	190
Middle East ²	350	80	2,150	320	230	130	430	330	(?)	(?)	70
Australia, New Zealand, South Africa.....	160	10	140	(?)	60	20	90	40	(?)	(?)	10
Central Africa ³	40	10	650	(?)	30	(?)	20	20	10		(?)
Japan.....	160	60	50	20	20	10		220	40	10	(?)
Other free Asia.....	150	10	110	(?)	90	(?)	220	380	20	(?)	10
Eastern Europe ⁴	(?)	140	740	60		(?)	60	60	2,480	260	10
China (mainland), etc. ⁵			20	(?)			20	10	130	(?)	80
Other ⁶	350	110	710	10	10	50	10	20	(?)		
Total ⁷	4,960	1,200	13,190	740	620	440	1,350	1,570	3,200	290	1,110

¹ Includes mineral fuels and related materials (SITC Section 3), metalliferous ores and metal scrap (SITC, Revised 29) and base metals (SITC, Revised, 67, 68, less 681). Data from United Nations, Monthly Bulletin of Statistics, March 1964, Special Table C; April 1964, Special Table B.

² Includes Aden, Cyprus, Jordan, Iraq, Israel, Lebanon, Syria, Libya, Ethiopia, Sudan, U.A.R.

³ Africa less Morocco, Algeria, Tunisia, Libya, Sudan, Ethiopia, Somalia, French Somaliland, and South Africa.

⁴ U.S.S.R., Albania, Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, Rumania.

⁵ Mainland China, Mongolia, North Korea, and North Viet-Nam.

⁶ Includes Morocco, Algeria, and Tunisia.

⁷ Less than US\$5 million.

⁸ Data not available.

⁹ Detail does not add to total due to rounding.

No data are available to show the proportion of total world trade by volume accounted for by mineral commodities, but evidence suggests that it is well over half the total tonnage of goods moving in international trade and probably growing as a percentage of the total. According to United Nations data, the tonnage of petroleum and petroleum products alone, which has risen consistently since 1956, in 1962 exceeded half the total of all seaborne international trade; to this of course would have to be added the millions of tons of other mineral commodities moving in international commerce.¹²

As compared with 1961, trade in major minerals in 1962 appears to have increased in volume by about 6 to 6.5 percent. Trade in iron ore was up by 6 percent, in coal and coke by 6 percent, and in crude petroleum by 8 percent. The level of nonferrous metal trade was practically unchanged, increased imports by the United States and Japan offsetting decreased takings by Western Europe.¹³

United Nations quantum indices of major mineral imports by chief industrial areas in 1961 and 1962 are shown in table 33.

TABLE 33.—Imports of major minerals¹ into selected industrialized countries
(Quantum index, preceding year=100)

Commodity	United States ²		EEC countries ³		United Kingdom		Japan ⁴		Total ⁵	
	1961	1962	1961	1962	1961	1962	1961	1962	1961	1962
Iron ore.....	75	135	99	98	83	86	141	110	102	106
Nonferrous ores and metals.....	104	114	103	95	91	100	95	128	100	100
Coal and coke.....	103	107	100	107	146	78	135	123	106	110
Crude petroleum.....	103	107	118	111	110	108	125	116	114	110

¹ Measured gross, not distinguishing imports later reexported or, in the case of the EEC, imports originating in the Community.

² Based in most cases on 11 months' returns.

³ Based on 8 months' returns.

⁴ Based on 9 months' returns.

⁵ Estimated on basis of partial returns indicated.

Source: United Nations Commodity Survey 1962.

Data permitting detailed examination of the patterns of international trade in minerals are readily available only for iron ore, steel products, bauxite, solid fuels, crude petroleum, and lead and zinc ores and concentrates. All relate to 1962 trade except those for lead and zinc ores and concentrates, which summarize 1963 trade.

In general, these tables are self-explanatory, but some comment on sources of data may be desirable. The tables for bauxite and iron ore were prepared by the Bureau of Mines. The table for steel products is a rearrangement of the data appearing in the United Nations' Economic Commission for Europe (ECE) study, *Statistics of World Trade in Steel 1962*, and the definitions, nomenclature, and other qualifications are as given in that document.

The tables of lead and zinc ores and concentrates, based on International Lead and Zinc Study Group data and relating to 1963, should be used with caution. In the cases of both metals they are

¹² United Nations. *Monthly Bulletin of Statistics*. January 1964, Special Table D-B, p. XVII.

¹³ General Agreement on Tariffs and Trade. *International Trade 1962*. Pp. 57-71.

based on partial data, and the data for Belgium-Luxembourg among the importers are for gross weight of ore rather than metal content, thus distorting the comparability of the figures. Even with these limitations, however, both tables tend to confirm the description of trade patterns given in this chapter.

TABLE 34.—World trade in bauxite in 1962, by areas

(Thousand metric tons)

Exporters	Destination						Total
	Canada	United States	Western Europe	Eastern Europe ¹	Japan	Other countries	
United States.....	164	-----	54	10	-----	36	264
Caribbean America.....	-----	7,465	-----	-----	-----	-----	7,465
South America.....	1,418	3,538	114	-----	53	33	5,156
Western Europe.....	-----	16	1,691	355	-----	24	2,086
Eastern Europe ¹	-----	-----	65	669	-----	-----	734
Free Asia.....	-----	-----	105	-----	982	62	1,149
Africa.....	22	-----	289	1	-----	23	335
Oceania.....	-----	-----	6	-----	-----	-----	6
Total.....	1,604	11,019	2,824	1,035	1,035	178	17,195

¹ Albania, Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, Rumania, and U.S.S.R.

TABLE 35.—World trade in iron ore concentrates and agglomerates in 1962, by areas

(Thousand metric tons)

Exporters	Destination							Total
	Canada	United States	South America	Western Europe	Eastern Europe ¹	Japan	Other countries	
Canada.....	-----	17,216	-----	3,208	-----	1,569	-----	21,993
United States.....	4,857	-----	-----	133	-----	997	5	5,992
South America (including Mexico).....	318	15,850	656	9,607	1,024	5,782	319	33,556
Western Europe.....	-----	29	-----	48,119	1,268	-----	53	49,469
Eastern Europe ¹	-----	-----	-----	901	18,355	-----	293	19,549
China, (mainland), North Korea, North Viet-Nam.....	-----	-----	-----	-----	100	-----	-----	100
Free Asia.....	-----	-----	-----	2,733	1,594	12,893	62	17,282
Africa.....	-----	503	-----	8,729	881	730	35	10,878
Oceania.....	-----	-----	-----	-----	-----	7	295	302
Total.....	5,175	33,598	656	73,430	23,222	21,978	1,062	159,121

¹ Albania, Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, Rumania, and U.S.S.R.

The tables for solid fuels and crude petroleum are similar to that for steel in that they are rearrangements of data appearing in the United Nations study, World Energy Supplies 1959-62, and are subject to the qualifications of that document; it is important to note, with respect to the petroleum table, that Libya is classified as part of the Middle East and not as part of Africa. In all tables relying on United Nations data the quantities may differ somewhat from data appearing in other sources but the general pattern of trade shown by them will not significantly differ from the picture given by other sources if allowance is made for treatment of Libya, in the petroleum table, as part of the Middle East.

TABLE 36.—Exports of semifinished and finished steel products in 1962¹

(Thousand metric tons)

Exporters	Destinations, by regions								
	Oceania	Far East ²	Middle East ³	Africa	Latin America	North America	Western Europe	European Communist countries	Total world ⁴
EEC:									
Belgium-Luxembourg.....	8.0	202.0	417.0	246.0	372.0	1,106.0	4,822.0	173.0	7,346.0
Germany, West ⁵	4.5	179.5	271.3	140.2	354.0	459.7	5,833.5	835.6	8,078.3
France.....	10.1	106.9	230.9	615.1	232.4	312.7	3,257.4	210.7	4,976.2
Italy.....	4.2	15.1	68.6	77.1	145.4	16.7	257.9	327.4	942.2
Netherlands.....	.4	9.4	24.6	58.7	27.8	19.3	895.2	68.5	1,103.9
EFTA:									
United Kingdom.....	192.5	360.3	133.6	253.5	301.6	322.4	1,267.2	286.6	3,117.7
Austria.....	.7	5.2	16.4	1.7	5.6	3.9	901.0	278.2	1,212.7
Sweden.....	2.5	34.6	6.4	6.2	45.7	57.1	488.3	45.7	686.5
Norway.....	-----	6.9	4.6	2.0	2.5	12.6	136.6	16.6	181.8
Other:									
Japan.....	101.0	1,494.0	96.0	114.0	375.0	1,024.0	375.0	244.0	3,823.0
United States.....	13.7	820.0	80.3	71.8	305.2	287.7	239.1	.5	1,818.3
Canada.....	34.6	21.7	7.5	7.6	145.4	380.2	183.9	-----	780.9
Australia ⁶	180.2	329.0	.3	13.3	19.3	132.3	11.4	-----	692.4
South Africa.....	2.4	11.9	4.2	120.1	17.6	45.1	134.6	-----	335.9
Yugoslavia.....	-----	49.6	16.1	.8	.2	2.2	126.7	54.7	250.3
Hungary.....	-----	18.8	56.1	.2	-----	-----	173.4	328.8	577.3
U. S. R.....	-----	350.1	82.6	42.5	200.5	-----	313.1	2,868.0	3,931.0
Poland.....	-----	76.3	98.1	10.5	14.5	.8	275.8	568.4	1,044.4
Total.....	554.8	4,091.3	1,614.6	1,781.3	2,564.7	4,182.7	19,692.1	6,306.7	40,898.8

¹ Ingots and semis, railway track material, heavy and light sections, wire rods, strip, plates, sheets, steel tubes and fittings, wire, tinplate, wheels, tires, and axles.

² Includes Afghanistan, Burma, Ceylon, mainland China, Taiwan, Malaysia, Hong Kong, India, Indonesia, Japan, Laos, North Korea, North Viet-Nam, Pakistan, Philippines, Republic of Korea, South Viet-Nam and Thailand.

³ Includes Bahrain, Iran, Iraq, Israel, Kuwait, Lebanon, Saudi Arabia, Syria, and UAR (Egypt).

⁴ Includes unallocated exports.

⁵ Excludes deliveries to East Germany.

⁶ Year ending June 30, 1962.

Source: United Nations, ECE Statistics of World Trade in Steel 1962.

TABLE 37.—Direction of trade in lead ores and concentrates in 1963

(Thousand metric tons of contained metal)

Exporters	Importing regions				
	Western Europe ¹	United Kingdom	United States	Japan	Total
Western Europe.....	31.6	-----	-----	-----	31.6
Eastern Europe.....	23.7	-----	-----	-----	23.7
Africa.....	139.1	-----	28.9	-----	168.0
North America.....	30.4	4.8	21.3	-----	56.5
Latin America.....	42.5	-----	55.5	10.8	108.8
Asia.....	1.7	1.2	-----	2.1	5.0
Oceania.....	18.6	12.0	24.0	35.5	90.1
Countries n.e.s.....	18.5	7.8	.6	-----	26.9
Total.....	306.1	25.8	130.3	48.4	510.6

¹ Includes Austria, Belgium-Luxembourg, France, West Germany, and Italy. Partial data for Austria (January-September), Belgium-Luxembourg (January-November) and Italy (January-October); gross weight of ore for Belgium-Luxembourg.

Source: International Lead and Zinc Study Group. Lead and Zinc Statistics. V. 4, No. 5, May 1964.

TABLE 38.—Direction of trade in zinc ores and concentrates in 1963

(Thousand metric tons of contained metal)

Exporters	Importing Regions				
	Western Europe ¹	United Kingdom	United States	Japan	Totals
Western Europe	309.9				309.9
Eastern Europe2				.2
Africa	150.0		7.5		157.5
North America	35.7	11.7	122.1	10.8	180.3
Latin America	145.1	1.4	204.9	33.1	384.5
Asia	14.6			13.3	27.9
Oceania	27.6	80.7	3.7	20.9	132.9
Countries n.e.s.	56.3	10.9			67.2
Total	739.4	104.7	338.2	78.1	1,260.4

¹ Includes Austria, Belgium-Luxembourg, France, West Germany, Netherlands, and Norway. Partial data for Austria (January-September) and Belgium-Luxembourg (January-November); gross weight of ore for Belgium-Luxembourg.

Source: International Lead and Zinc Study Group. Lead and Zinc Statistics, v. 4, No. 5, May 1964.

TABLE 39.—World movement of solid fuels¹ in 1962

(Thousand metric tons, Standard Coal Equivalent)

Destination	Exporting region						Total ²
	North America	Western Europe	Far East	Oceania	Africa	Other countries ³	
North America	11,800	40					11,850
Caribbean America	160					50	210
Other America	1,980	260			60	90	2,400
Western Europe	17,450	44,800			410	19,950	82,700
Middle East	30	40			10	290	370
Far East	6,460	100	1,580	2,890	730	2,200	14,000
Oceania	1	60		60	6		130
Africa		90			930	160	1,170
Other countries ³	10	540				31,150	31,700
Total	37,891	45,930	1,580	2,950	2,146	53,890	144,530

¹ Data based on general trade system (that is, including re-exports). Lignite, lignite briquets, and coke reduced to coal equivalent. Bunkers excluded.

² Includes Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, Rumania, and U.S.S.R.

³ Data does not add to right hand column total due to rounding.

Source: United Nations. World Energy Supplies 1959-62.

With respect to the table on steel products, the point of importance is the high proportion of the total imports in most geographic regions accounted for by intraregional trade in steel; in Western Europe 91 percent, in the European Communist countries 60 percent, and in the Far East and Oceania 37 percent and 32 percent, respectively, of total imports of steel was accounted for by intraregional trade in 1962. By contrast, only 16 percent of North American steel trade consisted of intraregional trade.

In crude petroleum the dominance of the less industrialized regions as exporters, and of the industrialized areas as importers, is clear; while in solid fuels the import status of Western Europe and the Far East (that is, Japan) and the dominance of North America (the United States) and Eastern Europe as exporters is plain. In contrast to crude petroleum, however, the solid fuel table shows a high proportion of total imports in the major industrial regions consisting of intraregional trade.

TABLE 40.—World movement of crude petroleum¹ in 1962

(Thousand metric tons)

Destination	Exporting regions								Total ⁴
	North America	Caribbean America	Other America	Western Europe	Middle East ²	Far East	Africa	Other ³	
North America.....	12,400	40,800	160	40	23,000	3,290	270	-----	79,900
Caribbean America.....	-----	49,000	250	35	4,530	-----	130	3,630	57,600
Other America.....	-----	7,610	370	-----	5,210	-----	-----	160	13,350
Western Europe.....	60	24,700	230	1,550	155,300	110	24,400	10,400	216,700
Middle East ²	-----	40	-----	280	23,300	-----	-----	1,180	25,300
Far East.....	180	280	-----	-----	44,900	10,450	-----	2,140	57,950
Oceania.....	-----	20	-----	-----	8,480	4,450	-----	-----	12,950
Africa.....	-----	100	-----	-----	2,020	-----	30	160	2,220
Other countries ⁴	-----	-----	-----	500	-----	-----	-----	9,010	9,510
Total.....	12,640	122,550	1,010	2,405	267,240	18,300	24,830	26,680	475,480

¹ Data based on general trade system (that is, including re-exports).² Includes Libya, Trucial Oman, and United Arab Republic (Egypt).³ Includes Czechoslovakia, East Germany, Hungary, Poland, and U.S.S.R.⁴ Data does not add to right hand column total due to rounding.

Source: United Nations. World Energy Supplies 1959-62.

A flow chart, figure 1, adapted from one prepared by the Copper Division, Business and Defense Services Administration, U.S. Department of Commerce, exhibits graphically the major flows of 1962 trade in copper.¹⁴ Statistical data on which the copper trade flow chart is based, converted from short tons as reported in the source, are given in table 41. The data do not cover all exports but only those of the seven major exporting countries, and the import data do not include all imports of the importing countries. The export data for Northern Rhodesia and the Republic of the Congo are partly estimated.

Data for world trade in 1963 are still incomplete but available information suggests that both the value and the volume of trade in minerals increased substantially with respect to that of 1962. According to preliminary United Nations indexes of volume, trade in solid fuels was up about 14 percent, in crude petroleum about 12 percent, and in aluminum about 12 percent. Trade in the nonferrous metals as a group remained at about the 1962 level, increases in aluminum and tin offsetting decreases in copper, lead, and zinc.

Trade in iron ore (another large item) also expanded substantially, with United Kingdom, Japanese, and EEC imports (from outside the Community), rising sharply, while United States imports remained at 1962 levels.

In terms of value as well as of quantity, however, solid fuels and crude petroleum evidently accounted for the bulk of the increase in world mineral trade in 1963.

¹⁴ U.S. Department of Commerce. Business and Defense Services Administration. Copper Industry Report. Summer 1963. V. 9, No. 4, pp. 8-9.

TABLE 41.—Crude and refined copper export shipments of major copper exporting countries in 1962, distributed by destinations

(Thousand metric tons)

Importing country	Exporting country						
	United States	Canada	Mexico	Chile	Northern Rhodesia ¹	Republic of the Congo ¹	Peru
United States.....		88	19	207			71
Canada.....	1						
United Kingdom.....	48	87		55	231	3	31
Germany, West.....	62	15		59	73	1	30
France.....	33	13		10	32	18	
Belgium.....	2	5		2	18	191	15
Italy.....	49	2		33	41	20	
Netherlands.....	6			49	1		5
Norway.....	3	15			1		
Sweden.....	4	5		29	19		
Switzerland.....	4			41	9		1
Other Europe.....	9	8			13	(²)	
Republic of South Africa.....					15	5	
India.....	59	3			34	3	
Japan.....	12	44		15	9	2	9
Other countries.....	14	4	1	15	41	43	9
Total.....	306	289	20	515	537	286	171

¹ Partly estimated.
² Data not available.

Source: Department of Commerce, Business and Defense Services Administration. Copper Industry Report, Summer 1963. V. 9, No. 4.

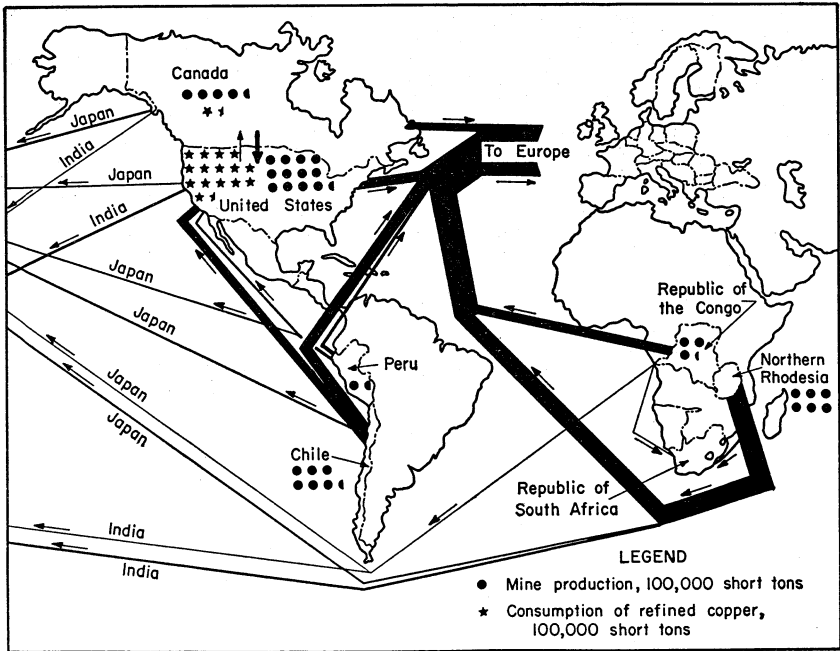


FIGURE 1.—Flow of world trade in copper, 1962. (Courtesy Department of Commerce, Business and Defense Services Administration).

TABLE 42.—World trade volume index

(1960=100)

Commodity	1961	1962	1963 ¹
Aluminum.....	88	98	110
Copper.....	103	100	97
Lead.....	112	116	105
Zinc.....	100	102	101
Nonferrous metals as group.....	100	101	101
Solid fuels.....	103	109	124
Crude petroleum.....	112	127	142

¹ Preliminary figures.

Source: United Nations, World Economic Survey 1963, Part II, Current Economic Developments.

TRANSPORTATION

Transportation costs are a key factor in the economic structure of the world's mineral industries, and changes in costs and available facilities play a large role in shaping the flow of mineral trade. The two forms of transport which affect the mineral industries significantly are maritime transport and pipelines.

Rapid changes have been occurring in both transport sectors. In the case of maritime transport these involve the sharply increasing sizes of both dry cargo and tanker vessels, the rapidly growing fleet of bulk carriers designed for ore or ore-oil carriage, and the development of specialized tankers for the transport of liquefied gas and molten sulfur. In pipelines, the principal development is the construction of international crude and products pipelines in Europe to serve the growing markets there, and the expansion of crude pipeline facilities from the North African fields. A second development, just beginning, is the construction of international gas pipelines to market the Netherlands and North European natural gas discovered in the last 3 years.

The world's merchant fleet at the end of 1963 comprised over 18,000 vessels with a total deadweight tonnage of 194.3 million tons, an increase of 5 percent over 1962. Of this total, 3,436 with a deadweight tonnage of 74 million tons consisted of tankers (including whaling tankers), and 1,726 with a deadweight tonnage of 23.8 million tons consisted of bulk carriers. In recent years both bulk carriers and tankers have increased their share of the total in terms of tonnage; in 1961 bulk carriers accounted for 9 percent of the total and tankers for 37 percent; in 1962 bulk carriers accounted for 11 percent and tankers for 38 percent; while in 1963 the bulk carrier percentage rose to 12 percent and tankers remained at 38 percent. Bulk carrier tonnage increased by 25 percent in 1962 and by 20 percent in 1963. After a rapid rise in the late fifties, tanker tonnage as a percentage of the total appears to have been relatively stable in the past 3 years.¹⁵

Moreover, the size of both bulk carriers and tankers has been growing, limited primarily by harbor depths and terminal facilities at ports. In 1962 more than 40 percent by tonnage of the world's dry

¹⁵ U.S. Department of Commerce, Maritime Administration. Merchant Fleets of the World, Seagoing Steam and Motor Ships of 1,000 Gross Tons and Over as of December 31, 1963. Report No. MAR 560-20, May 12, 1964, p. 2.

World Petroleum, v. 34, No. 12. November 1963, pp. 38-41.

cargo fleet was 10,000 gross registered tons (GRT) or over, 16 percent 20,000 GRT or over, and 8 percent 25,000 GRT or over, in the same year 24 percent of the tanker fleet was 40,000 GRT or over, and 83 percent by tonnage of new tankers on order were 45,000 GRT or over. The decreasing per ton cost of transport as size of vessels goes up explains the growing size of vessels.

The seaborne trade in minerals is divided into three fairly separate trades—the ore trade, the petroleum trade, and the coal trade. Typically, the petroleum trade has long been handled by company-owned tankers supplemented by time chartering of other tankers in the market as needed, while in the past both the ore trade and the coal trade were handled primarily by the chartering of vessels (frequently on a voyage basis) in the open market. The ore trade practice is rapidly shifting and a steadily increasing volume of the total is now handled either by industry-owned ore carriers or by other bulk carriers chartered by the industries on long term. United States, British, and Japanese steel companies or industries possess their own fleets, as do some of the U.S. aluminum companies. The coal trade, on the other hand, still relies on chartering in the open market.¹⁶

Both bulk carriers and tankers can be diverted to the grain trade, the other principal bulk cargo, though the ordinary tramp freighters with which they compete in that trade cannot economically be shifted to the ore and oil trades. This possibility affects the structure of freight rates and causes a tendency for rates in different trades to move together.

In both the tanker and dry cargo trades the increasing size, efficiency, and specialization of new ships tend to make older and smaller vessels uneconomic, and a situation thus arises in which at the same time a statistical surplus of tonnage exists and large new tonnages are coming off the ways, with an inevitable effect on freight rates.

In the summer of 1963 the International Tanker Owners Association, then representing an estimated 54 percent of the tanker tonnage expected to come on the free market by the end of the year, devised a scheme to encourage the laying-up of nonprofitable vessels in order to stabilize rates. Japanese and American owners did not participate. The scheme was to go into effect on September 10, 1963.¹⁷ At mid-1964 it was reported that the scheme had probably had some effect; lead-up tonnage was stabilized at a level somewhat under 1 million tons, though the usual seasonal decline occurred in the winter of 1963-64. All except one of the laid-up tankers were said to be under 25,000 tons, and in the spring of 1964 some 2.5 million tons of smaller tankers were reported to have been shifted to the grain trade.¹⁸

Requirements for tankers were said also to be affected by the development of North African fields as a source of crude petroleum for European markets, and by the construction of pipelines from the European Mediterranean coast to interior refineries and markets, which are discussed briefly later. The shortening of the tanker hauls resulting from this tends to reduce the demand for sea transport.¹⁹

¹⁶ Data in this and the preceding paragraph are chiefly from Organization for Economic Cooperation and Development, *Maritime Transport 1962*, pp. 21-27, and Statistical Annex thereto.

¹⁷ *The Economist*. Aug. 24, 1963, p. 638.

¹⁸ *The Economist*. June 13, 1964, p. 1265.

¹⁹ *The Economist*. Apr. 11, 1964, p. 180.

Nevertheless, continuing high levels of industrial output and import demand in the main industrialized regions of the world, plus the extraordinary demands for grains and fuels due to crop failures and the adverse winter of 1962-63, pushed most ocean freight rates upward during the year. Table 43 shows UN-published indexes for dry cargo and tanker rates based on Danish, West German, Netherlands, Norwegian, and British indexes.

TABLE 43.—Indexes of ocean freight rates¹

(1958=100)

Year	Dry cargo (Trip charter)				Tankers (Trip charter)				L.T.B.P. ⁵
	Denmark	West Germany	Netherlands ²	Norway ³	United Kingdom ⁴	West Germany	Norway ³		
							£ market	\$ market	
1959	103	103	-----	102	107	97	101	94	90
1960	111	110	100	105	111	100	96	97	81
1961	111	111	91	108	118	87	89	88	76
1962	108	100	75	99	98	101	101	98	73
1963	114	117	88	109	120	130	135	116	71
1963:									
January	108	106	-----	98	103	150	158	135	-----
February	111	110	178	102	104	198	200	181	174
March	111	110	-----	103	108	168	153	126	-----
April	109	113	-----	103	111	106	116	104	-----
May	109	117	185	106	122	105	107	100	172
June	112	108	-----	104	117	85	93	77	-----
July	112	108	-----	103	112	68	81	71	-----
August	112	111	186	108	116	73	99	75	166
September	114	117	-----	113	122	91	104	87	-----
October	116	137	-----	126	149	159	165	146	-----
November	119	135	101	126	142	169	165	142	170
December	120	130	-----	119	141	193	184	150	-----

¹ United Nations. Monthly Bulletin of Statistics. June 1964, Special Table E.² Quarterly; general index, weighted average of quotations for all commodities unloaded in Netherlands ports and carried by ships over 500 gross registered tons (GRT).³ Norwegian Shipping News; for tankers, sterling and dollar quotations separately.⁴ United Kingdom Chamber of Shipping, general index; excludes dollar quotations.⁵ London Tanker Brokers Panel; quarterly estimates of weighted average of all known charter rates for two size classes; tankers owned by oil companies included at weighted averages of all charter rates. Index constructed by UN Statistical Office.

Pipeline developments of major importance to the international mineral trade in 1963 included the expansion of Algerian and Libyan pipeline facilities and the completion, at the end of 1962, of one major line (the South European pipeline) from Marseilles to the Strasbourg-Karlsruhe area on the upper Rhine River. Plans exist to extend this to Ingolstadt in southern West Germany. Other lines are under construction or in the planning stage; one from Genoa to Ingolstadt via Ulm, with a possible extension to Munich, and a second from the head of the Adriatic to Vienna, for which at least two separate proposals have been made.²⁰

A second petroleum pipeline project of great potential importance is the so-called COMECON or Druzba pipeline from the Soviet Urals-Volga area to the Communist countries of Eastern Europe. Designed to link this region with refineries in Poland, East Germany, Hungary, and Czechoslovakia, the pipeline was also planned to include extensions to the Baltic ports of Klaipeda and Ventspils and possibly to

²⁰ The Economist. Aug. 24, 1963, p. 690; May 2, 1964, p. 516.

World Petroleum. V. 34, No. 10; September 1963, p. 64; v. 34, No. 12, November 1963, p. 78; v. 35, No. 1, January 1964, pp. 36-37.

Odessa on the Black Sea. According to the (U.S.) National Petroleum Council, the section from Brody (in the western U.S.S.R.) to Uzhgorod on the Hungarian border and Bratislava in Czechoslovakia was completed in late 1961, and work on the main 1,350 kilometer segment from Kuibyshev to Mozyr' was to begin in 1962.²¹ According to another report, the entire COMECON pipeline is to be completed by the third quarter of 1964, presumably excluding the Baltic extensions, on which work is said to have been indefinitely suspended at the end of 1960. The same report indicates that in the view of the chairman of the Soviet export agency the line when completed will not be sufficient to meet the expected demands of the countries.²²

Finally, a significant transport development of somewhat lesser importance was the completion of the canalization of the Moselle River in Germany and France, which opened a channel for barges up to 1,350 tons in size to the Lorraine steel complex in France. This is expected to reduce transport costs for coal and ore, and partially remove the transport handicaps under which that portion of the French steel industry has worked.²³

PRICES

The United Nations 1963 overall export price indexes for minerals showed little change from 1962 levels, and in the case of metallic ores showed a decline.

The experience of the developed and underdeveloped areas differed, however, as shown in table 45.

Despite the small changes in the yearly averages there were steady upward pressures on the prices of most internationally trade minerals during the course of the year which, in most cases, began to take effect from midyear on. Of the nonferrous metals, prices of aluminum, lead, zinc, and tin rose during the year and copper prices began to rise at the very end of the year. Prices of nickel, bauxite, and petroleum remained at about 1962 levels. Prices of iron ore and the additive minerals, particularly manganese and chrome, were generally lower. Coal prices averaged the highest since 1957.²⁴

TABLE 44.—Minerals export price indexes¹

(1958=100)

Year	Metal ores	Fuels	Total
1959	97	92	94
1960	98	91	93
1961	100	90	92
1962	99	90	92
1963	96	91	92

¹ United Nations, Monthly Bulletin of Statistics. June 1964, Special Table C. II.

²¹ National Petroleum Council. Impact of Oil Exports From the Soviet Bloc. V. II, pp. 138-194.

²² World Petroleum. November 1963, v. 34, No. 12, pp. 42-45.

²³ The Economist. May 23, 1964, p. 826.

²⁴ American Bureau of Metal Statistics. Year Book (Forty-third Annual Issue for the Year 1963), 143 pp.

Engineering and Mining Journal. V. 165, No. 2, Feb. 1964, 160 pp.

International Lead and Zinc Study Group. Lead and Zinc Statistics, v. 4, No. 5, May 1964, 28 pp.

International Tin Council, Statistical Bulletin, v. 8, No. 5, May 1964, p. 58.

United Nations. World Economic Survey 1963. Part II, Current Economic Developments, 95 pp.

TABLE 45.—Analysis of export price indexes¹

(1958=100)

Year	Developed areas		Underdeveloped areas	
	Minerals	Nonferrous metals ²	Minerals	Nonferrous metals ²
1959.....	95	108	93	117
1960.....	96	111	91	120
1961.....	97	108	90	114
1962.....	97	106	90	115
1963.....	99	106	90	116

¹ United Nations, Monthly Bulletin of Statistics, June 1964, Special Table C. III.² Excludes precious metals.

Copper prices in the United States were stable at US\$0.306 per pound throughout the year, and were supported at the level of £234 per long ton on the London Metal Exchange in the first half by producers, who in the latter part of the year sold at the same level as demand rose, in order to stabilize the price. In December 1963 the price on that exchange began moving upwards, averaging £235.900 for the month.

Aluminum prices were held steady by producers at US\$0.225 per pound in New York and £180 per long ton in London until October, when they were raised to US\$0.23 and £184, respectively.

Lead and zinc prices fluctuated more but their rises began earlier, in February and March in London and at midyear in New York. Prices of lead in London rose from an average of £54.3 per long ton in January to an average of £74.4 in December; the corresponding rise for zinc was from £67.7 to £94.9 per long ton. In New York lead prices rose from US\$0.103 in January to US\$0.125 in December, while zinc rose from US\$0.115 to US\$0.13.

Tin prices, dominated by the continuing shortfall of new production, U.S. stockpile releases, and International Tin Council efforts to stabilize them within the agreement range, shot upward in the last quarter as the Council's buffer stock was exhausted. From a January average of £852.046 per long ton in London the price rose steadily until May, receded slightly in the summer, and rose to an average of £1,010.950 in December.

Conscious efforts by producers to control traditionally fluctuating nonferrous metal prices were significant in the case of copper, and it was clear that their price policies were dominated by competitive considerations. Copper producers had adopted voluntary output restrictions in 1962, and large African producers had been supporting prices on the London Metal Exchange at £234 per ton; in the latter part of 1963 they appeared as sellers at this price in the face of upward trends and did not permit the price to rise until aluminum producers, their principal competitors for power transmission cable, had raised their prices. Lead and zinc producers made no effort to stabilize price levels but it began to be evident that they were unhappy about the sharp 1963 rises; reporting to shareholders in the spring of 1964, the chairmen of both Rio Tinto-Zinc and New Broken Hill Consolidated expressed fears of consumer substitution of other materials, and the former ex-

pressed the hope that the U.S. Government would consider stockpile releases of both metals, as had been requested by lead-zinc producers and consumers in the United States.²⁵

At issue, the question appeared to be the role of the London Metal Exchange in the metal markets of the world. The major metal market outside the United States, it has dominated the formation of nonferrous metal prices for most of the world, and both producers and consumers have relied on its quotations for the pricing of contracts. Moreover, it has been freer in many respects than most other markets, since U.S. metal prices are affected by both tariffs and quotas. The Metal Exchange itself has in the past year attempted to broaden its role by introducing a "Continental" contract and authorizing Rotterdam as a delivery point; and it has also had under consideration the introduction of trading in aluminum. Efforts of producers to stabilize prices appeared to some observers as a possible threat to the future role of the Exchange, and some seemed to believe that a dual-price structure was here to stay, at least in the case of copper.²⁶

TABLE 46.—Nonferrous metal prices in the United States in 1963

(Monthly averages, cents per pound)¹

Month	Aluminum ²	Copper ³	Lead ⁴	Zinc ⁵	Tin ⁶
January.....	22.500	30.600	10.296	11.500	111.131
February.....	22.500	30.600	10.500	11.500	108.597
March.....	22.500	30.600	10.500	11.500	109.250
April.....	22.500	30.600	10.500	11.500	112.940
May.....	22.500	30.600	10.500	11.500	116.670
June.....	22.500	30.600	10.713	11.500	117.806
July.....	22.500	30.600	11.068	12.025	115.426
August.....	22.500	30.600	11.354	12.500	114.892
September.....	22.500	30.600	11.628	12.500	116.088
October.....	22.978	30.600	11.935	12.500	119.902
November.....	23.000	30.600	12.147	12.500	126.882
December.....	23.000	30.600	12.500	12.943	130.238

¹ As reported by Engineering and Mining Journal.

² Unalloyed ingot, 99.5 percent.

³ Electrolytic, New York, Domestic refinery.

⁴ Refined lead, New York, domestic.

⁵ Prime western slab zinc, f.o.b. East St. Louis.

⁶ Straits, New York.

Source: American Bureau of Metal Statistics Year Book. (Forty-third Annual Issue for the Year 1963).

²⁵ The Economist. Apr. 25, 1964, p. 429; May 16, 1964, pp. 768-69.
The Statistician. June 5, 1964, pp. 739-740.

²⁶ The Economist. Apr. 13, 1963, pp. 160-161; June 8, 1963, pp. 1044-1046.
The Statistician. June 5, 1964, pp. 739-740.

TABLE 47.—Nonferrous metal prices in the United Kingdom in 1963

(Monthly averages, £ per long ton)¹

Month	Aluminum ²	Copper ³	Lead ⁴	Zinc ⁵	Tin ⁶
January.....	180.000	234.263	54.250	67.583	852.046
February.....	180.000	234.275	54.683	69.550	852.400
March.....	180.000	234.250	55.746	71.654	856.404
April.....	180.000	234.313	57.867	74.183	881.000
May.....	180.000	234.271	60.604	76.013	905.054
June.....	180.000	234.304	64.975	75.933	967.896
July.....	180.000	234.263	65.121	74.342	901.675
August.....	180.000	234.250	67.058	76.363	905.025
September.....	180.000	234.250	67.817	76.642	934.954
October.....	183.870	234.250	68.667	80.138	940.238
November.....	184.000	234.296	69.038	84.079	975.333
December.....	184.000	235.900	74.321	94.708	1,010.950

¹ As reported by Engineering and Mining Journal.² Ingot, 99.5 percent.³ London Metal Exchange, electrolytic wire bars.⁴ London Metal Exchange, refined pig lead, 99.97 percent.⁵ London Metal Exchange, virgin zinc, 98 percent minimum.⁶ London Metal Exchange, monthly average settlement price.

NOTE.—Official rate of exchange is £1=US\$2.30.

Source: American Bureau of Metal Statistics. Year Book (Forty-third Annual Issue for the Year 1963).

GOVERNMENT POLICIES AND PROGRAMS

In this section, only selected aspects of some policies or programs of a multilateral character and U.S. Government policies and programs with effects on international mineral production and trade are reviewed. Readers interested in the mineral policies and programs of specific countries should refer to the appropriate country chapters of this volume (or, for those of the U.S. Government, to volumes 1 and 2 of the Minerals Yearbook) for a discussion of them.

The only international commodity agreement applying to a mineral product is the International Tin Agreement. Twenty-one Governments representing producing and consuming countries (Australia, Austria, Belgium, Bolivia, Canada, Republic of the Congo, Denmark, France, India, Indonesia, Italy, Japan, Republic of Korea, Malaysia, Mexico, Netherlands, Federation of Nigeria, Spain, Thailand, Turkey, and the United Kingdom) are members. The United States is not a member but consults with the Council on matters of common interest. The primary object of the agreement is to stabilize tin prices through the operation of a buffer stock managed by a buffer stock manager under the direction of the International Tin Council, the executive body established by the Agreement. Floor and ceiling prices are established by the Council; at the floor price the buffer stock manager must buy, at the ceiling price he must sell, and in an intermediate range designated the "middle sector" he neither buys nor sells.

During 1963 operating within the limits of floor and ceiling prices (then £790 and £965) the buffer stock manager was compelled to sell out the entire stock in a vain effort to halt price rises, notwithstanding the sale of substantial quantities of tin from U.S. Government stockpile in the same period. Upon exhaustion of the Council's stock at the end of the third quarter the price shot upward as noted earlier.

Throughout the year the Council had constantly under consideration the question of U.S. Government stockpile disposals, which had been going on under Congressional authorization since 1962. At the Council's third meeting of the year in October it decided to ask the U.S. Government to confer in Washington at a mutually convenient early date with a representative mission from the Council in order to obtain an understanding between the Council and the U.S. Government concerning plans for future disposals of tin. This meeting occurred about the end of November.

At its fourth meeting of the year in December the Tin Council revised the price range upward, the floor price becoming £850 and the ceiling price £1,000, with the middle sector becoming £900 to £950 per long ton.²⁷

During 1963 U.S. stockpile authorities began developing long-range plans for disposals of a number of commodities in accordance with the recommendations of an interagency committee approved by the President on January 30, 1963. Among these recommendations was one proposing "that the goal of long-term disposals should be the sale of surplus materials in amounts which can be absorbed by regular marketing channels without avoidable loss to the Government and without creating hardships in the domestic or friendly foreign economies, and that plans should be established on an individual commodity basis in amounts and over periods of time which will not unduly interfere with production and employment."²⁸ It is planned that consultations with appropriate industries, foreign governments, and Government agencies will accompany the development of major disposal plans so that interested groups will have an opportunity to express their views.

U.S. import quotas for lead and zinc were unchanged in 1963. Petroleum import quotas were modified so that quotas for imports of crude oil and products into areas east of the Rocky Mountains are based on a percentage of estimated crude and natural gas liquid production during the quota period instead of on a percentage of past production. This modification does not apply to residual fuels.

One other major policy problem of an international character was not resolved during 1963 but there were significant developments with respect to it. This is the effort of the six countries of the European Economic Community to develop a common energy policy. The question is fully reviewed in the 12th annual report of the European Coal and Steel Community High Authority.²⁹

In 1957 the High Authority of the Coal and Steel Community and the executives of the EEC and Euratom had been charged with pursuing long-term energy studies, presenting periodic reports to the High Authority and the Governments, and submitting to the Council of Ministers proposals for energy policy. In 1962 (April 5), the Ministers asked the executives to prepare proposals for a common energy policy. They submitted two memoranda on the subject in that

²⁷ This summary of the Tin Council's activities is taken from its Statistical Bulletin, May 1964.

²⁸ Office of Emergency Planning. Stockpile Report to the Congress. January-June, 1963, p. 1.

²⁹ European Coal and Steel Community High Authority. 12e Rapport General sur l'activité de la Communauté. (1 février 1963-31 janvier 1964, pp. 61-96.) The following account is derived from this.

year, one (June 25, 1962) on energy, policy and one (December 21, 1962) on long-term energy perspectives. The energy policy memorandum proposed the establishment of a common energy policy in two stages: in the first stage reliance would be placed on national measures, and in the second on Community institutions. The Ministers asked the High Authority to study the legal implications of this and to suggest the changes that might be necessary in the basic agreements of the EEC, European Coal and Steel Community, and Euratom.

On April 10, 1963 the High Authority submitted to the Ministers a "draft agreement for creating conditions permitting the realization of a common market in energy." In its annual report the High Authority described this text as "flexible enough to meet any criticism inspired by the same principles as the memorandum"; that is, the energy memorandum of June 1962.

On March 21, 1963 the Council of Ministers discussed the long-term energy study and appointed a working group to study it. On May 2, 1963, it noted submission of the draft agreement, and decided to have the energy memorandum examined by a special energy policy committee whose work would proceed parallel with that of the working group, which was directed to report to it. The special committee was to be composed of high officials designated by member states, and representatives of the High Authority, the European Economic Community Commission, and the Euratom Commission. The draft agreement was referred to it on June 6, 1963. Its report was to be submitted before October 31, 1963.

The High Authority in its annual report described the working group's report as containing "a solid nucleus of common opinions" regarding energy, in general agreeing with the energy study. It notes, however, that before the special committee could consider it, the Council referred to it a proposal of the West German Government for a "transitional protocol" which in effect would authorize subsidies to the coal industry without regard to the provisions of the Coal-Steel Community agreement. The special committee had to consider this and the working group's report together; as a consequence it had to concentrate on economic questions and had no time to consider the juridical aspects. At the end of the special committee's study, the representatives of governments serving on it drafted a resolution which was transmitted to the Council of Ministers on November 22, 1963.

The Council considered this on December 2, 1963, and failed to reach unanimous agreement. Representatives of the High Authority, the EEC Commission, and the Euratom Commission were present. The High Authority's annual report indicates that the three executives considered the resolution "clearly insufficient to realize a common energy policy."

The High Authority enumerated five conditions which it declared must be met for the proposal to obtain its support: First the common energy policy must go into effect beginning January 1, 1970; second the draft resolution constitutes a "first step" toward the application of principles enunciated in the interexecutive memorandum; third the High Authority's conception of a common energy policy is set forth in the memorandum and confirmed by the draft agreement; fourth grants

of subsidies must be subordinated to the prior authorization of the High Authority; and fifth it is important to establish special measures for coke.

Being unable to decide, the Council remanded the draft resolution to the special committee with the other documents, with instructions to report before the March 1964 session of the Council.

The core of the differences between the draft agreement and the draft resolution, of which the texts are printed in the High Authority's report, appears to be mainly in the enunciations of their objects.³⁰ The draft agreement, in its article 2, enunciates its objects as one to assure consumers a free choice of energy sources, two to promote lower prices, insofar as consistent with stability, three to insure safety and regularity of supplies, four to facilitate development of research in all forms of energy, five to avoid unnecessary protective measures, and six to facilitate the adaptation of industry to the evolution of energy supplies. The draft resolution, on the other hand, would have as its objects the "realization of conditions assuring economically reasonable exploitation of sources of energy by avoiding distortions among producers susceptible of disturbing the common market," and the promotion of the development of energy production within the Community; it also calls for aids and subsidies to coal, promotion of community oil production, and a common inventory or stock policy.

The High Authority in its annual report noted that at the time of writing it was preparing another initiative on the subject.

Finally, another problem of multilateral character is foreshadowed by the discovery of large deposits of natural gas near the North Sea coasts of the Netherlands and Germany, and the subsequent explorations of offshore areas in the North Sea itself for petroleum- and/or gas-bearing strata. All drilling so far has been confined to territorial waters, but late in 1963 the U.K. Government enacted legislation empowering it to claim areas of the continental shelf sea-bottom and license concessions therein, under the terms of the 1958 Geneva Convention regarding the subsurface resources of the continental shelf.³¹ No move has yet been made by any government to bring about a parceling out of jurisdictional claims to the North Sea Continental Shelf, but presumably all with territories bordering that sea will eventually put forward claims.

³⁰ The draft agreement also provides for necessary changes in the three Community agreements, to which the draft resolution does not address itself.

³¹ *The Economist*. Nov. 30, 1963, p. 943; July 18, 1964, p. 273.