

The Mineral Industry of Other Areas of the Far East and South Asia

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BANGLADESH¹

The only economically significant mineral exploited in Bangladesh during 1981 was natural gas. Nitrogenous fertilizer production was important to the agricultural sector and was totally dependent on the natural gas for fuel and raw material. Domestic cement plants were also fueled by natural gas. The flat river-delta terrain for most of Bangladesh makes the potential for discovering major mineral deposits poor. No large deposits of metal ores have been found and only in the small hilly southeastern section of the country is there even much chance of finding any. Heavy mineral sand deposits may eventually be exploited along the Chittagong coastline. There is a good potential for crude oil discoveries.

The Bangladesh economy has been heavily subsidized by billions of dollars of foreign aid since the country's inception. A World Bank report recommended total aid needs of over \$2.6 billion in fiscal year (FY) 1980-81. It received commitments for barely over one-half that amount.

The Government's ambitious second 5-

year development plan began in July 1, 1980, and called for a rather optimistic series of social and economic reforms that included lowering the population growth rate, cutting unemployment, greatly increasing the food supply, and accelerating the pace of economic development.

As part of the means of achieving the 5-year plan goals, the Government stated that measures had been taken to liberalize the investment incentives to both local and foreign industries. Policy has swung around in recent years to one of actively encouraging the participation of the private sector in economic development.

Despite the optimistic industrial development plans, Bangladesh's continuing extremely large trade deficit forced unwanted but necessary economic adjustments. By the end of December 1981, the original \$15.5 billion plan, adopted in July 1980, had been revised to \$10.9 billion.² The industrial sector was to drop from 18% to 15%, while the agriculture sector would be increased from 32% to 35%. The target for food production

had been 20 million tons but that was reduced to 17.5 million tons.

Another adjustment made during the year was a series of small currency devaluations. By yearend 1981, the Bangladesh currency stood devalued to the extent of nearly 19%. The spot selling rate of the dollar finished the year at taka 20.1512 against the dollar.

The electric power situation continued to hinder industrial progress. A Government official stated that industrial units suffered \$5.8 million direct losses owing to power failures and load shedding during FY 1980-81. In addition, over 1 million worker hours were lost for the same reason.

Compared with that of previous years, however, the situation was relatively better and improving steadily. The Government was making every effort to increase the generating capacity and to improve the reliability and distribution of the power that was available. The official installed capacity increased to 822 megawatts in June 1980 from 718 megawatts in November 1979.³ New units were brought online and others were refurbished during 1981 bringing the new capacity even higher, assuming none of the older obsolescent plants were withdrawn from service.

Several new projects were under construction or in late stages of design at yearend 1981. A 50-megawatt unit was to go online at the Kaptai hydroelectric plant (also referred to as Karnaphuli) by yearend 1981. Its completion would bring the plant to a capacity of 130 megawatts.

The Government has signed an agreement with the U.S.S.R. for design and technical assistance worth about \$75 million for a gas-fired 210-megawatt thermal station at Ghorasal, about 50 kilometers north of Dacca. The Ghorasal powerplant had a reported capacity of 110 megawatts. One Bangladesh newspaper stated that the U.S.S.R. had signed a similar agreement last year for the same sized unit at the same plant. A 210-megawatt unit would be the largest in the country, and it is doubtful if the Soviet technicians would attempt to erect and finance two such sophisticated units simultaneously. A second 210-megawatt unit may be planned but construction probably would not begin until the first unit was installed.

The United Kingdom was to finance an expansion of the Ashuganj powerplant, about 100 kilometers northeast of Dacca. The project is to be a 90-megawatt combined

cycle powerplant. This type of plant uses a natural gas fueled gas turbine to turn the generator and a conventional boiler and turbogenerator powered by the hot exhaust gases from the gas turbine.

Coal-fired units of 110 megawatts at Khulna and 60 megawatts at Chittagong were reportedly under construction with Czechoslovakian aid.

To increase efficiency and lower the overall cost of generation, a foreign contractor was constructing a 239-kilovolt double circuit transmission line for the Government. It will interconnect the gas-fueled eastern transmission network with the oil- and coal-fueled western network. The line will initially operate at 132 kilowatts and will run 153 kilometers from Tongi to Ishurdi and cost about \$100 million.

The Government continued the planning for a nuclear powerplant at Roopur in Pabna District. Apparently it has decided on a capacity of 300 megawatts. The French Technocatome reactor was reportedly favored over United States, Canadian, Swedish, or Soviet plants. The restraint was financing, which Bangladesh was requesting from friendly countries and international aid agencies.

The Ministry of Finance estimated exports for FY 1980-81 would hit \$758 million. This would represent a 5.5% increase over that of FY 1979-80, but a realistic comparison was difficult because of the currency changes during the year. Minerals contributed no significant part in the export earnings (less than 0.01%). Jute, jute products, tea, leather, and seafood accounted for nearly all of the exports. The export target for FY 1981-82 was proposed at \$803 million.

Again in FY 1980-81, the cost of imports far exceeded the value of the exports. Total imports were expected to be about \$2,424 million. Raw materials, fuel, and manufactured goods were the major imports. Most of the widening trade deficit was expected to be met by foreign aid.

COMMODITY REVIEW

Japan, the Organization of Petroleum Exporting Countries, and the International Development Bank agreed to help Bangladesh develop the Bakhrabad Gasfield just southeast of the capital city of Dacca. The project-implementing authority will be the newly formed Government-owned Bakhrabad Gas Systems Ltd., a subsidiary of the Bangladesh Oil and Gas Corp. (Petrobangla).

Under the \$164 million project, four production wells will be drilled, and the original exploration well will be completed for production as well. As a result of the agreement, the first production well was spudded in May 1981. In addition to the wells, the project includes the following: gas gathering and conditioning facilities; a 177-kilometer, 61-centimeter-diameter pipeline from Bakhrabad to Chittagong; a 60-kilometer distribution system in Chittagong; and a 16-kilometer branch line to a proposed urea fertilizer plant.

At the old Titas Gasfield, the fifth production well was completed in June 1981, bringing the field's production capacity to about 150 million cubic feet per day. Three additional new production wells were to be completed by 1984. The foreign exchange component of the expansion will be financed by a loan from the Asian Development Bank.

In April 1981, the Government commissioned the 30.5-centimeter-diameter, 58-kilometer pipeline connecting the Habiganj Gasfield with the Ashuganj Fertilizer and Chemical Co. The \$13 million pipeline was built by the Titas Gas Transmission and Distribution Co., a subsidiary of Petrobangla. It will supply 50 million cubic feet of gas per day to the plant at peak load. A branch pipeline connects with the Titas Gasfield distribution network and will supplement the Titas network with an additional 70 million cubic feet of gas per day. The new Habiganj pipeline complements a 25.4-centimeter branch line already existing from the Titas network to the fertilizer plant.

In addition to the developments described above, Petrobangla has been engaged in a relatively ambitious program of exploration for additional gas reserves and the hope that there is oil in some of the gas-prone geologic structures.

Petrobangla has drilled the most exploration wells in Sylhet and Comilla Districts, but seismic surveys and other exploration were being done throughout the country.

To date, 13 locations have been referred to as gasfields in the Bangladesh press, and four are actually in production. Total reserves have been quoted over a wide range of figures, often on the basis of only one exploration well per field. Over 4.5 trillion cubic feet of gas were generally considered proved, and the figure could go up above 10 trillion if Petrobangla's prognostications turn out to be correct.

The country has consumed increasing

amounts of natural gas each year since 1974. Despite the steady increase, the ratio of gas consumed to total recoverable reserves is one of the lowest in the world. On a global basis about 3% of known reserves are consumed each year. In Bangladesh, however, that figure is only 0.01% of the proved reserves.

Bangladesh has been slow to utilize this valuable resource mainly because of a lack of investment capital to develop the fields and distribution network, but also because of the limited number of industries in the country that need gas for their operations.

The Government has now given priority to the development of an expanded pipeline transmission system to bring the gas to market. Through increased exploitation and improved delivery, Dacca hopes to cut back its crude oil and petroleum product import bill by as much as 75% from its present \$700 million per year.

Unlike the U.S. use of gas, very little consumption is by the domestic and commercial sectors. The breakdown of gas consumption during FY 1980-81 was as follows: electric power generation, 39%; fertilizer production, 35%; other industrial users, 16%; domestic customers, 7%; and commercial users, 3%. Power, fertilizers, and new industrial users will increase consumption a great deal in the next few years as new projects are completed and begin using relatively more of the natural gas resources.

Currently there is no gas service to the western section of the country, forcing that region to rely on expensive imported oil or coal. Petrobangla was planning a \$300 million project to take gas across the Jamuna River, a distributary of the Brahmaputra River, to feed the northwestern region of the country. No starting date has been announced for this project, which would require financing from abroad.

During 1981, there was no progress on a proposal to build an export-oriented liquefied natural gas (LNG) plant or to sell natural gas to India via a large pipeline.

The most important development in the fertilizer industry during 1981 was the long delayed commissioning of the Ashuganj nitrogen fertilizer plant on December 7, 1981. The plant has a design capacity of 242,000 tons per year nitrogen content of urea and cost approximately \$400 million. The plant was mainly financed by foreign aid.

Production of urea fertilizer, which was scheduled to increase during the year, was adversely affected by severe mechanical

problems late in 1981 at the old 156,000-ton-per-year nitrogen urea plant at Ghorasal. The urea shortfall had to be covered by increased fertilizer imports.

In a move to gain self-sufficiency in nitrogen fertilizer production, the Government has obtained financing for two ammonium-urea complexes to be located at Chittagong. They will be based on the natural gas reserves being developed at the Bakhrabad Gasfield and will each have a capacity of 262,000 tons per year nitrogen content of urea.

The first unit, with completion planned for yearend 1983, will be financed by the International Finance Corp. and by export credits from Sweden and Denmark. Swed-yards Corp. of Sweden will prefabricate the plant, which will be floated to Chittagong for erection. The Karnaphuli Fertilizer Co. has been set up to operate the plant. Formal contracts are to be signed by June 1982. Output is intended for the export market.

The second unit, to be operated by Chittagong Urea Fertilizer Ltd., was expected to be completed 2 years later with output intended for the domestic market. Cost was estimated to be \$467 million with the Asian Development Bank supplying

most of the foreign exchange credit.

The state-owned Bangladesh Chemical Industries Corp. contracted with a Netherlands company for construction of triple superphosphate granulation equipment at its Chittagong phosphate plant. Construction was scheduled to begin in early 1982. The 25-ton-per-hour unit will be the first such equipment in the country. The plant currently produces fertilizer in powder form which allows a high rate of waste from blowing and from washing by rain.

Plans to build a direct-reduction steel plant at Chittagong made some headway during the year. Talks between the Bangladesh Government and a group of companies led by Metallurgical and Engineering Consultants (Indian Government owned) were reportedly in final stages near yearend.⁴ The plant would have a design capacity of 660,000 tons per year and was estimated to cost \$180 million. India would supply the iron ore under a 50% buyback arrangement. The Indian company would supply the equipment and construct the plant, while Austrian and Japanese members would provide the technical expertise and much of the capital.

Table 1.—Other Areas of the Far East and South Asia: Production of mineral commodities¹

Area and commodity	1977	1978	1979	1980 ^P	1981 ^Q
BANGLADESH²					
Cement, hydraulic ³ ----- metric tons	307,666	338,614	322,473	301,493	*344,830
Clays: Kaolin ³ ----- do.	⁴ 4,120	⁵ 7,778	7,305	10,278	⁶ 9,825
Gas, natural, marketed ^{3, 5} ----- million cubic feet	⁷ 32,360	34,294	39,265	45,364	⁴ 49,936
Iron and steel: ³					
Crude steel (ingots only) ----- metric tons	107,715	116,916	126,371	137,557	*139,343
Mild steel products ----- do.	138,140	138,277	200,415	169,327	*186,013
Nitrogen: N content of ammonia ----- do.	107,100	105,100	167,132	139,361	150,000
Petroleum refinery products:					
Gasoline ----- thousand 42-gallon barrels	491	523	473	440	NA
Jet fuel ----- do.	60	55	60	18	NA
Kerosine ----- do.	2,021	2,289	2,529	2,499	NA
Distillate fuel oil ----- do.	1,317	746	1,005	1,168	NA
Residual fuel oil ----- do.	3,031	2,742	3,380	2,574	NA
Lubricants ----- do.	209	--	--	--	NA
Naphtha ----- do.	--	--	585	785	NA
Unspecified ----- do.	832	1,174	267	312	NA
Refinery fuel and losses ----- do.	375	278	*306	287	NA
Total ----- do.	8,336	7,807	8,605	8,083	NA
Salt, marine ³ ----- metric tons	345,600	785,517	674,074	700,000	700,000
Stone: Limestone, industrial ³ ----- do.	61,303	60,059	56,738	44,764	*37,943
BRUNEI²					
Gas, natural:					
Gross ----- million cubic feet	346,011	^Q 342,000	344,000	386,900	342,000
Marketed ----- do.	314,253	307,600	310,000	NA	NA

See footnotes at end of table.

Table 1.—Other Areas of the Far East and South Asia: Production of mineral commodities¹—Continued

Area and commodity	1977	1978	1979	1980 ^p	1981 ^e
BRUNEI²—Continued					
Natural gas liquids:					
Condensate thousand 42-gallon barrels	3,062	^e 2,900	3,000	NA	NA
Natural gasoline do	816	890	900	NA	NA
Liquefied petroleum gas do	166	175	180	NA	NA
Total do	4,044	^e 3,965	4,080	NA	NA
Petroleum:					
Crude do	76,650	76,585	84,000	87,600	64,240
Refinery products:					
Gasoline do	141	141	^e 150	NA	NA
Distillate fuel oil do	219	219	^e 210	NA	NA
Residual fuel oil do	1	1	^e 2	NA	NA
Other do	32	32	^e 37	NA	NA
Refinery fuel and losses do	1	1	^e 1	NA	NA
Total do	394	394	^e 400	NA	NA
CHRISTMAS ISLAND²					
Phosphate rock thousand metric tons	1,186	^r 1,386	1,367	1,713	⁴ 1,423
HONG KONG²					
Cement, hydraulic do	1,029	1,236	1,279	1,489	⁴ 1,503
Clays: Kaolin metric tons	2,466	25,655	2,841	748	⁴ 8,216
Feldspar do	3,378	3,157	742	2,974	⁴ 194
Feldspar sand do	—	—	—	12,964	⁴ 6,176
Iron and steel: Crude steel ^e do	75,000	75,000	90,000	90,000	120,000
Quartz do	2,063	665	2	12	—
KAMPUCHEA^{e 2}					
Cement, hydraulic do	50,000	10,000	—	—	—
Gold, mine output, metal content troy ounces	1,000	—	—	—	—
Salt metric tons	30,000	12,000	26,500	30,000	32,000
LAOS^{e 2}					
Gypsum do	—	—	—	⁴ 20,000	⁴ 40,500
Salt, rock do	10,000	15,000	18,000	20,000	20,000
Tin, mine output, metal content do	600	400	300	350	400
MONGOLIA^{2 e}					
Cement, hydraulic thousand metric tons	100	166	183	178	180
Coal:					
Anthracite and bituminous ^e do	240	250	250	250	250
Lignite and brown ^e do	3,084	3,548	3,864	^r 4,126	4,350
Total do	3,324	3,798	4,114	4,376	4,600
Copper, mine output, metal content metric tons	—	^e 4,000	21,700	44,000	⁴ 71,800
Fluorspar, all grades thousand metric tons	^e 320	455	567	580	⁴ 604
Gypsum do	^e 28	^e 28	28	30	30
Lime, hydrated and quicklime do	^e 50	36	46	50	50
Petroleum refinery products: ^{e 7}					
Kerosine thousand 42-gallon barrels	23	23	23	NA	NA
Residual fuel oil do	20	20	20	NA	NA
Salt metric tons	^e 15,000	^e 15,000	15,000	15,000	15,000
NEPAL⁸					
Beryllium: Beryl, industrial-grade (10%-12% BeO) kilograms	777	320	120	140	⁴ 102
Cement, hydraulic metric tons	42,036	35,850	21,364	30,744	⁴ 30,574
Clay for cement manufacture do	NA	3,000	4,000	4,000	⁴ 2,000
Coal: Lignite do	1,956	1,700	37,530	3,461	⁴ 8,174
Copper ore:					
Gross weight do	6	^e 35	—	6	⁴ 6
Cu content do	^e 1	7	—	1	⁴ 2
Gem stones:					
Beryl kilograms	5	2	—	NA	NA
Garnet do	29,600	12,000	4,000	⁴ 41,295	⁴ 105,925
Tourmaline do	75	50	25	NA	⁴ 13
Lime, agricultural metric tons	NA	NA	10,054	10,000	10,000
Magnetite, crude do	—	—	7	15,000	20,000
Salt do	NA	7	7	8	⁴ 8
Stone:					
Limestone do	54,391	50,000	62,400	32,400	⁴ 83,565
Marble:					
Chips do	67	131	66	343	⁴ 366
Cut square meters	761	1,370	863	3,083	⁴ 3,561
Craggy cubic meters	NA	2,320	799	NA	⁴ 963
Talc metric tons	77	510	325	1,460	⁴ 71

See footnotes at end of table.

Table 1.—Other Areas of the Far East and South Asia: Production of mineral commodities¹—Continued

Area and commodity	1977	1978	1979	1980 ^P	1981 ^e
SINGAPORE²					
Cement, hydraulic ^e thousand metric tons	1,350	1,350	1,350	^r 1,952	2,000
Iron and steel metal: Crude steel do	206	280	297	300	350
Petroleum refinery products:					
Gasoline thousand 42-gallon barrels	13,152	10,679	17,664	19,144	NA
Jet fuel do	21,194	35,970	31,221	32,914	NA
Kerosine do	21,173	18,094	20,322	20,610	NA
Distillate fuel oil do	51,189	59,775	62,304	63,321	NA
Residual fuel oil do	69,436	78,424	85,705	81,309	NA
Lubricants do	3,278	3,964	4,316	4,269	NA
Other do	28,110	33,131	35,538	30,453	NA
Refinery fuel and losses do	9,086	9,953	6,741	10,404	NA
Total do	216,618	249,990	263,811	262,424	NA
Stone: Granite, broken thousand cubic meters	2,572	2,235	2,507	3,185	⁴ 4,478
Sulfur, byproduct of petroleum metric tons	23,043	25,000	26,000	25,000	25,000
SRI LANKA					
Cement, hydraulic thousand metric tons	356	575	592	571	600
Clays:					
Ball clay metric tons	1,590	2,309	13,291	11,457	10,000
Kaolin do	5,182	5,541	5,870	6,614	7,000
Brick and tile clay do	132,621	86,000	⁹ 90,000	62,518	60,000
Clay for cement manufacture do	34,617	103,232	90,988	21,148	20,000
Feldspar, crude and ground do	3,679	3,160	3,790	3,955	4,000
Gem stones, precious and semiprecious, except diamond value, thousands	² \$28,828	³ \$33,718	³ \$31,919	⁴ \$42,819	NA
Graphite, all grades metric tons	8,875	¹⁰ 10,506	9,402	7,794	5,150
Iron and steel semimanufactures do	²⁸ 28,000	³⁰ 30,000	³⁰ 30,000	NA	NA
Mica, scrap do	¹ 100	140	369	145	200
Petroleum refinery products:					
Gasoline thousand 42-gallon barrels	858	1,098	782	910	NA
Jet fuel do	580	276	248	270	NA
Kerosine do	1,423	1,632	1,449	1,600	NA
Distillate fuel oil do	2,722	2,681	2,410	3,550	NA
Residual fuel oil do	3,608	3,646	3,563	4,800	NA
Other do	1,071	1,069	¹ 1,100	1,450	NA
Refinery fuel and losses do	651	390	³ 387	520	NA
Total do	10,913	10,792	9,939	13,100	NA
Phosphate rock metric tons	--	--	9,063	5,000	5,000
Rare-earth metals: Monazite concentrate, gross weight do	⁵ 5	^r 213	213	63	60
Salt do	51,923	149,825	121,443	114,279	110,000
Sand, glass do	NA	¹ 1,500	2,370	--	--
Stone:					
Limestone thousand metric tons	566	975	1,132	1,261	1,200
Quartz, massive metric tons	768	803	676	741	800
Titanium concentrates, gross weight:					
Ilmenite do	34,092	33,041	55,370	33,956	⁴ 80,011
Rutile do	978	11,497	14,675	12,789	⁴ 13,301
Zirconium: Zircon concentrate, gross weight do	¹⁰ 10	3,297	1,510	3,031	⁴ 3,266
VIETNAM¹⁰					
Cement, hydraulic thousand metric tons	845	843	729	641	650
Chromium: Chromite metric tons	¹² 12,400	13,100	¹⁴ 14,000	15,000	15,000
Clays: Kaolin ^e do	1,000	1,100	1,200	1,250	1,250
Coal: Anthracite thousand metric tons	6,200	6,000	5,300	5,300	5,900
Gypsum ^e metric tons	12,000	13,600	14,000	15,000	15,000
Iron and steel metal:					
Ingot steel thousand metric tons	88	98	¹¹ 110	120	110
Semimanufactures, rolled ^e do	40	50	^r 106	⁶ 62	65
Nitrogen: N content of ammonia ^e metric tons	10,000	20,000	25,000	NA	NA
Phosphate rock ^e do	1,500	1,800	400	500	550
Salt thousand metric tons	580	530	⁵ 525	520	500

See footnotes at end of table.

Table 1.—Other Areas of the Far East and South Asia: Production of mineral commodities¹—Continued

Area and commodity	1977	1978	1979	1980 ²	1981 ³
VIETNAM ¹⁰ —Continued					
Tin:					
Mine output ----- metric tons--	*250	*250	*200	370	550
Metal, smelter ⁴ ----- do.-----	200	200	160	350	500
Zinc:					
Mine output, metal content ⁵ ----- do.-----	10,000	8,000	6,000	6,500	6,000
Metal, smelter, primary ⁶ ----- do.-----	9,000	7,200	5,400	5,500	5,500

¹Estimated. ²Preliminary. ³Revised. NA Not available.

⁴Table includes data available through Aug. 16, 1982.

⁵In addition to the commodities listed, other crude construction materials such as sand and gravel and other varieties of stone presumably are produced, but available general information is inadequate to make reliable estimates of output levels.

⁶Data are for years ending June 30 of that stated.

⁷Reported figure.

⁸Gross production is not reported; the quantity vented, flared, or reinjected is believed to be negligible.

⁹In addition to the commodities listed in the body and footnote 2, molybdenum production was initiated in October 1978, but output is not reported and no basis is available for reliable estimates of output levels.

¹⁰As reported by Statistical Office of the United Nations in 1979 Yearbook of World Energy Statistics, p. 557.

¹¹Data are for the Nepalese fiscal year ending mid-July of that stated.

¹²Figure includes both gem- and industrial-grade garnet; 4,295 kilograms gem quality and 37,000 kilograms industrial quality.

¹³In addition to the commodities listed, iron ore was mined in the past and pig iron was produced at industrial facilities, but the status of these industries under prevailing conditions is not sufficiently clear to allow formulation of reliable estimates of output levels. Similarly, data on output of crude construction materials are not available, and no basis is available to make reliable estimates of output levels.

BRUNEI⁵

Brunei, little known to the world's business community, is one of the world's smallest but wealthiest states. Brunei will become independent from Britain at the end of 1983 and is expected to become a member of the Association of Southeast Asian Nations (ASEAN) by the end of 1984.

The total area of the state is only 5,765 square kilometers bordering on the northern part of Malaysia's Sarawak Province, northwest of Indonesia's Kalimantan (Borneo). The area is 3% cultivated; 22%, industry, urban, pasture, and waste; and 75% forested. In 1981, the population was estimated at 213,000. Among them, about 52% are native Malays; 24%, Chinese; and 23%, other ethnic minorities. The labor force of the private sector totaled about 32,200 persons, of which about 30.5% were in agriculture; 32.8% in industry, manufacturing, and construction; 33.8% in trade, transport, and service; and 2.9% in other.

Brunei's gross national product (GNP) at current dollars was estimated at about \$1.9 billion in 1979.⁶ Its per capita GNP was the highest among the Far East and South Asian countries. The Government of Brunei imposes no personal income tax on its residents. The wealthy status of Brunei was derived mainly from its rich oil and natural gas resources.

Brunei's economy is dominated by the oil and gas industry. Over the past years, Brunei's production of oil and natural gas has helped the state to accumulate about \$9

billion in foreign reserves and a surplus revenue of \$2.8 billion in 1981. The output of oil and natural gas accounted for 88% of Brunei's gross domestic product (GDP), and export earnings of oil and LNG were about 98% of Brunei's total export earnings.⁷ In 1981, Brunei was the world's third largest LNG exporter following Indonesia and Algeria. The Government of Brunei, in an effort to control the inflation rate, was using surplus revenues to subsidize the cost of essential foodstuffs as well as gasoline. In addition, salaries and wages were being held steady by the Government, while no tax increases on public utilities were sought.

Brunei imported about 80% of its food requirements. It also imported most of the plant equipment, capital goods, and consumer goods. As a result, most of Brunei's inflation rate was caused by imported goods. In 1981, the inflation rate in Brunei was about 10%. Because of the reduced exports of oil and LNG owing to the lower oil prices, Brunei's real GDP in constant dollars declined 20.9% in 1981.⁸

According to the state financial officer, the export earnings from oil and gas were estimated at \$3.5 billion for the state in 1981. Exports of crude oil and LNG were mainly to Japan, while Brunei's imports of foods, capital goods, and consumer goods were principally from Japan, the United States, the United Kingdom, and Singapore.

COMMODITY REVIEW

Petroleum and Natural Gas.—Brunei's production of crude oil and natural gas declined in 1981. The total output of crude oil averaged 176,000 barrels per day in 1981 compared with 240,000 barrels per day in 1980, while the output of natural gas also dropped from 1,060 million cubic feet per day in 1980 to 937 million cubic feet per day in 1981. The sharp drop in the output of oil in 1981 was partially owing to the world oil glut but was largely owing to a depletion policy implemented by the Government of Brunei and the oil producer to reconcile the level of oil production with the economic needs of the Government.

Production of crude oil in Brunei was by Brunei Shell Petroleum Co., Ltd. (BSP). To increase the ultimate recovery of Brunei's oil and gas resource as well as to accelerate its program of nonassociated gas production from the West Fields and the new Gannet Field, BSP has invested a total of about \$518 million in 1981 compared with \$340 million in 1980 and about \$260 million in 1979. Of this total expenditure in 1981, \$225 million was for operation and maintenance of the

company's production system, and \$293 million was for enhanced oil recovery projects in the Southwest Ampa, Seria, and Champion Fields. During 1981, the company also spent about \$26 million on exploration and discovered only one new oil well called Ampa West. According to the latest estimates by BSP, Brunei's recoverable oil reserves are about 1.5 billion barrels.^a

Brunei's production of LNG was by Brunei Liquefied Natural Gas Ltd. at Lumut using the natural gas produced from the fields of the Southwest Ampa, Seria, and Champion Seven offshore complex. Under a long-term contract, Brunei is committed to supplying to Japan about 5.1 million tons of LNG annually. The Japanese importers of Brunei's LNG are Tokyo Electric Power Co., Tokyo Gas Co., and Osaka Gas Co.

According to BSP officials, the company's output will be dominated by gas rather than oil for the coming years. This is because of a long-term commitment to supply LNG to Japan for a 20-year period. To meet this export commitment, the company was accelerating its development program on non-associated gasfields offshore in the West Fields and the new Gannet Field.

Table 2.—Brunei: Exports and reexports of mineral commodities

(Metric tons unless otherwise specified)

Commodity	1978	1979	Destinations, 1979	
			United States	Other (principal)
METALS				
Aluminum metal including alloys, all forms	40	20	--	Malaysia 13; Singapore 7.
Copper metal including alloys, all forms	51	187	--	Malaysia 182.
Iron and steel:				
Scrap	4,020	6,533	--	Thailand 2,439; Singapore 1,544; Other Asia, n.e.s. 2,449.
Semimanufactures:				
Bars, rods, angles, shapes, sections	250	265	--	Malaysia 261.
Universals, plates, sheets	310	46	--	Malaysia 45.
Wire	5	8	--	All to Malaysia.
Tubes, pipes, fittings	1,182	2,051	--	Singapore 1,376; Malaysia 675.
Castings and forgings, rough	77	40	--	Malaysia 37.
Lead metal including alloys, all forms	--	13	--	Singapore 9; Malaysia 4.
Tin metal including alloys, all forms	(¹)	7	--	Singapore 5.
Zinc metal including alloys, all forms	9	18	--	All to Malaysia.
Other: Nonferrous metal scrap	278	197	--	Singapore 177.
NONMETALS				
Abrasives: Grinding and polishing wheels and stones	2	(²)	--	All to Malaysia.
Cement	952	1,944	--	Do.
Clay products, nonrefractory ³	28	31	--	Malaysia 20; Singapore 11.
Fertilizer materials:				
Crude:				
Phosphatic	--	2	--	All to Malaysia.
Potassic	--	3	--	Do.
Manufactured: Phosphatic	--	2	--	Do.
Ammonia	--	1	--	All to Singapore.
Salt	9	2	--	All to Malaysia.
Sodium compounds: Caustic soda	23	--	--	All to Malaysia.
Sulfur: Sulfuric acid	--	1	--	All to Malaysia.
Stone, sand and gravel:				
Dimension stone, worked	--	1	--	Do.
Gravel and crushed stone	408	204	--	Do.

See footnotes at end of table.

Table 2.—Brunei: Exports and reexports of mineral commodities —Continued

(Metric tons unless otherwise specified)

Commodity	1978	1979	Destinations, 1979	
			United States	Other (principal)
NONMETALS—Continued				
Stone, sand and gravel—Continued				
Sand excluding metal-bearing -----	--	17	--	All to Malaysia.
Other:				
Crude -----	125	1	--	NA.
Building materials of asphalt, asbestos and fiber cements, unfired non-metals -----	42	2	--	All to Malaysia.
MINERAL FUELS AND RELATED MATERIALS				
Gas, natural ----- value, thousands ..	\$570,862	\$676,564	--	All to Japan.
Hydrogen and rare gases ----- do.	\$17	\$38	--	Malaysia \$37.
Petroleum:				
Crude and partly refined thousand 42-gallon barrels ..	82,148	89,761	9,521	Japan 54,437; Singapore 8,184; Republic of South Africa 4,844.
Refinery products:				
Gasoline ----- do.	4,823	5,690	1,301	Japan 4,128.
Kerosine and white spirit ----- do.	6	6	--	All to Malaysia.
Distillate fuel oil ----- do.	4	2	--	Singapore 1.
Unspecified ----- do.	7	9	--	Mainly to Malaysia.

NA Not available.

¹Unreported quantity valued at \$2,000.²Unreported quantity valued at \$1,000.³Excludes unreported quantity valued at \$13,000 in 1978 and \$111,000 in 1979.

Table 3.—Brunei: Imports of mineral commodities

(Metric tons unless otherwise specified)

Commodity	1978	1979	Sources, 1979	
			United States	Other (principal)
METALS				
Aluminum:				
Oxides and hydroxides -----	2	2	--	Netherlands 1.
Metal including alloys, all forms -----	523	494	20	Japan 205; Singapore 161.
Copper metal including alloys, all forms -----	375	550	38	Singapore 402.
Iron and steel:				
Metal:				
Pig iron including cast iron, powder, shot -----	--	1	1	
Steel, primary forms -----	(¹)	231	--	Hong Kong 128; Singapore 103.
Semimanufactures:				
Bars, rods, angles, shapes, sections -----	11,213	29,716	40	Japan 11,685; Singapore 3,978; China 2,916.
Universals, plates, sheets -----	4,023	2,944	40	Japan 1,487; Singapore 965; United Kingdom 148.
Hoop and strip -----	3	2	1	China 1.
Rails and accessories -----	3	163	--	Australia 112; Singapore 51.
Wire -----	623	620	67	Singapore 297; China 131.
Tubes, pipes, fittings -----	51,619	32,985	5,337	Japan 20,404; Singapore 2,804; West Germany 2,556.
Castings and forgings, rough -----	418	338	53	Singapore 89; Malaysia 44; United Kingdom 42.
Lead metal including alloys, all forms -----	62	49	NA	Singapore 22; Japan 10; United Kingdom 9.
Mercury ----- value, thousands ..	\$2	--	--	
Nickel metal including alloys, semimanufactures -----	49	21	10	Singapore 6; Japan 4.
Silver metal including alloys, unwrought and partly wrought -----	--	\$148	--	All from United Kingdom.
Tin metal including alloys, all forms -----	24	27	4	Japan 16.
Uranium ore and concentrate -----	\$6	\$2	\$2	
Zinc metal including alloys, all forms -----	23	7	2	Japan 3.
Other:				
Ash and residue containing non-ferrous metals -----	264	315	--	All from Singapore.
Oxides, hydroxides, peroxides -----	184	38	1	Singapore 23; Netherlands 10.
Alkali, alkaline-earth, rare-earth metals -----	(²)	2	--	All from Singapore.

See footnotes at end of table.

Table 3.—Brunei: Imports of mineral commodities —Continued

(Metric tons unless otherwise specified)

Commodity	1978	1979	Sources, 1979	
			United States	Other (principal)
NONMETALS				
Abrasives:				
Natural: Pumice, emery, corundum, etc.				
Grinding and polishing wheels and stones	3	2	--	All from Singapore.
Cement	7,710	6,248	1	United Kingdom 3,083; China 118; Singapore 1,063.
Clays and clay products:				
Crude	99,576	66,122	--	Japan 22,796; Philippines 10,516; Singapore 6,418.
Products:				
Nonrefractory ³	618	1,412	914	Singapore 437.
Refractory	3,543	3,236	--	China 1,739; Singapore 461; Malaysia 123.
Diatomite and other infusorial earth	5	21	1	Singapore 16.
Fertilizer materials:	--	26	--	All from Singapore.
Crude	986	196	6	West Germany 130; Singapore 31; Thailand 20.
Manufactured:				
Nitrogenous	259	585	--	West Germany 473; Japan 102.
Phosphatic	22	580	--	West Germany 279; Singapore 177; Japan 124.
Potassic	10	259	--	All from Zaire.
Other including mixed	4	31	2	Singapore 20.
Ammonia	28	13	2	Malaysia 5; Singapore 4.
Gypsum and plasters	91	33	9	Thailand 10; Australia 7.
Lime	41	27	--	Singapore 23.
Magnesite	356	--	--	--
Mica:				
Crude including splittings and waste	11	94	13	Singapore 64; Netherlands 17.
Worked including agglomerated splittings value, thousands	--	\$4	--	Austria \$2; India \$2.
Pigments, mineral:				
Crude	2	4	--	All from Singapore.
Iron oxides, processed	(⁴)	1	--	Mainly from Singapore.
Salt	1,026	556	--	Singapore 408; Thailand 130.
Sodium and potassium compounds:				
Caustic potash	13	16	--	Hong Kong 6; Singapore 6.
Caustic soda	262	144	--	Netherlands 100.
Stone, sand and gravel:				
Dimension stone:				
Crude and partly worked	374	1,093	--	Malaysia 1,089.
Worked	172	138	--	Singapore 121.
Dolomite, chiefly refractory-grade	26	10	--	All from Malaysia.
Gravel and crushed stone	11,884	29,786	2,584	Malaysia 23,885; Singapore 3,317.
Limestone excluding dimension	29	5	--	All from Singapore.
Sand excluding metal-bearing	443	1,546	1,273	Singapore 165.
Sulfur: Sulfuric acid	40	52	--	Singapore 46.
Other:				
Crude	11,698	1,679	--	Thailand 1,150; Singapore 442.
Slag, dross similar waste, not metal-bearing	4	5	--	All from Singapore.
Building materials of asphalt, asbestos and fiber cements, unfired non-metals	7,830	2,134	11	Singapore 1,483; Malaysia 567.
MINERAL FUELS AND RELATED MATERIALS				
Asphalt and bitumen, natural	10	55	--	All from Singapore.
Coal excluding briquets	10	--	--	--
Coke and semicoke	2	--	--	--
Hydrogen, helium, rare gases value, thousands	\$58	\$121	\$25	Singapore \$63; United Kingdom \$32.
Petroleum refinery products:				
Gasoline				
thousand 42-gallon barrels	289	310	--	All from Singapore.
Kerosine and jet fuel do	(⁵)	(⁵)	--	Mainly from Australia.
Lubricants do	24	25	(⁵)	Singapore 21.
Unspecified do	6	6	(⁵)	Singapore 5.
Mineral tar and other coal-, petroleum-, and gas-derived crude chemicals value, thousands	\$4	\$6	\$1	Singapore \$4.

NA Not available.

¹Unreported quantity valued at \$5,000.²Unreported quantity valued at \$1,000.³Excludes unreported quantity valued at \$15,000 in 1978 and \$27,000 in 1979.⁴Unreported quantity valued at \$1,000.⁵Less than 1/2 unit.

CHRISTMAS ISLAND¹⁰

Christmas Island is in the Indian Ocean. It is located 360 kilometers south of Java Head. The British Government sovereignty in the island was transferred to the Australian Government on October 1, 1958. The area of the island is only about 135 square kilometers. Estimated population in 1980 was 3,184. The population comprises Chinese, 1,834; Malays, 847; Europeans, 382; and others, 121.

The island's economy has been dominated for decades by the phosphate rock industry. Christmas Island was the second largest producer of phosphate rock in Asia, following China. Its output of phosphate rock accounted for 1% of the world's total in 1981. Production of phosphate rock was formerly by a shared operation between Australia and New Zealand, and the British Phosphate Commission. In 1981, a new company, the Phosphate Mining Co. of Christmas Island, was established to supersede the old British Phosphate Commission for mining and shipping the phosphate. New Zealand, reportedly, is to withdraw from the share operation, but will be allowed to import phosphate from Christmas Island in the future.

The output of phosphate ore peaked in 1974 with 1.8 million tons; since then the

annual production has remained steady at about 1.3 to 1.4 million tons. The average P_2O_5 content of phosphate ore produced in 1981 was about 35.1%. In 1981, Christmas Island exported about 1.36 million tons of phosphate rock mainly to Australia and New Zealand. About 150,000 tons of phosphate dust was shipped to Malaysia and Singapore.

The Phosphate Mining Co. of Christmas Island reportedly was considering a \$4.5 million¹¹ investment for further exploration of phosphate on the island. The phosphate reserves on the island were estimated to last for 7 more years at the current rate of production.¹²

Table 4.—Christmas Island: Exports of phosphate rock, by destination

(Thousand metric tons)

Destination	1979	1980
Australia -----	632	853
Indonesia -----		7
Malaysia -----	111	157
New Zealand -----	612	602
Singapore -----	5	19
Total -----	1,360	1,638

HONG KONG¹³

Economic performance of Hong Kong as measured by the growth in real GDP was strong and impressive in 1981. Its real GDP grew 10.4% in 1981 compared with 9.8% in 1980.¹⁴ The accelerated growth in Hong Kong's economy in 1981 was stimulated mainly by a 10.5% expansion in domestic demand and by a 7.6% real growth in exports. However, Hong Kong's economy suffered a high inflation rate of 15.5% in 1980-81 compared with a 5% average inflation rate in the 1976-79 period.

Hong Kong's GDP in 1973 constant dollars was estimated at \$12.5 billion in 1981 compared with \$12.7 billion in 1980.¹⁵ In 1981, the mining and quarrying industry contributed less than 0.1% to Hong Kong's GDP. Services and manufacturing remained the dominant sectors, contributing about 85% to the total output of the economy. In 1981, out of a 2.5 million labor force in Hong Kong, only 870 persons were engaged in mining and quarrying. The overall unem-

ployment rate of Hong Kong was at a modest 4.3% in 1981 compared with 3.8% in 1980.¹⁶

Feldspar, kaolin, feldspar sand (derived from washing kaolin), and cement were the mineral products produced by the mining and quarrying industry in 1981. Opencast methods were used to mine feldspar and kaolin. Most of the feldspar was exported to Taiwan, while kaolin was consumed by local industries. Cement production was by Green Island Cement Co., Ltd., owned 27.6% by the Cheung Kong Holdings, Ltd.; and Hong Kong Cement Manufacturing Co., Ltd. Green Island Cement operated a cement plant at Kowloon Bay with an annual capacity of about 2 million tons. To boost cement output by 14%, the company was building new production facilities that were scheduled for completion by the first half of 1982. Hong Kong Cement operated a 220,000-ton-per-year grinding plant in Hong Kong. A 1.5-million-ton-per-year grinding plant near Tuen Mun, to be operated by

China Cement Corp., was scheduled to come onstream in September 1982. China Cement is owned 60% by Cheung Kong Holdings, 37% by Kaiser Cement Corp. of the United States, and 3% by Japan's Onoda Cement Co.

Hong Kong's steel production was by Shun Fung Iron Works, Ltd., at Junk Bay in Kowloon with an annual capacity of about 100,000 tons. Shiu Wing Steel, Ltd., and Fuji Marden & Co., Ltd., were also locally important steel producers. The annual rolled steel capacity of Shiu Wing Steel was about 29,000 tons; and Fuji Marden, about 10,000 tons. Scrap, pig iron, and steel ingots were imported from China and Taiwan for producing iron and steel manufactures in Hong Kong.

Hong Kong imported most of its requirements for raw materials and semimanufactures to support the export-oriented light and heavy industries. In 1981, Hong Kong's merchandise imports totaled about \$25 bil-

lion, of which 51.0% was raw materials and food, 26.7% was manufactured consumer goods, 14.6% was plant and capital equipment, and 7.7% was petroleum and petroleum products. In 1981, Hong Kong's total exports including reexports were about \$22 billion, of which 97.6% were manufactured goods, and 2.4% were food and agricultural products. Because of the slower growth in total earnings as a result of the worldwide economic recession, Hong Kong's deficit increased to \$2.9 billion in 1981 from \$2.7 billion in 1980.

Based on the total trade value, Japan, China, the United States, Taiwan, Singapore, and the United Kingdom were the major trading countries for Hong Kong's imports in 1981; while the United States, China, Japan, the Federal Republic of Germany, and the United Kingdom were the major trading countries for Hong Kong's domestic exports and reexports.

Table 5.—Hong Kong: Exports and reexports of mineral commodities

(Metric tons unless otherwise specified)

Commodity	1979	1980	Destinations, 1980	
			United States	Other (principal)
METALS				
Aluminum:				
Ore and concentrate	8,760	17,440	--	Taiwan 14,825; Republic of Korea 1,300; Indonesia 964.
Oxides and hydroxides	1,396	2,576	--	Indonesia 1,939; Taiwan 500; Malaysia 52.
Metal including alloys, all forms ...	23,929	31,626	891	Japan 9,892; North Korea 4,382; Indonesia 2,142.
Arsenic: Trioxide, pentoxide, acid	7	38	--	Mainly to Vietnam.
Chromium oxides, hydroxides, acids ...	61	258	--	Indonesia 153; Taiwan 49; Republic of Korea 36.
Cobalt oxides and hydroxides	7	5	--	Taiwan 3; Singapore 2.
Copper:				
Sulfate	32	34	--	Indonesia 31; Singapore 2; Taiwan 1.
Oxides and hydroxides	3	4	--	All to Malaysia.
Metal including alloys, all forms ...	15,447	19,115	50	Japan 14,957; Taiwan 1,576; China 638.
Gold:				
Waste and sweepings				
value, thousands	\$2,232	\$1,258	\$426	Japan \$410; Switzerland \$190; Italy \$118.
Metal including alloys, unwrought and partly wrought .. troy ounces ..	299,612	959,666	1,575	United Kingdom 542,832; Switzerland 157,217; Canada 101,243.
Iron and steel metal:				
Scrap	344,285	329,649	--	Taiwan 278,689; Japan 27,857; Thailand 20,351.
Pig iron, cast iron, ferroalloys	1,418	594	100	Malaysia 162; Australia 80; Fiji 65.
Steel, primary forms	9,692	13,975	--	Philippines 7,649; Taiwan 5,840; Indonesia 486.
Semimanufactures	91,965	102,005	5	China 26,304; Indonesia 24,810; Macau 15,726.
Lead:				
Oxides and hydroxides	33	121	--	Mainly to Indonesia.
Metal including alloys, all forms ...	1,838	2,273	--	Taiwan 1,723; Japan 277; China 149.
Magnesium metal including alloys, all forms	140	93	--	North Korea 64; Japan 28.
Manganese:				
Ore and concentrate	--	295	--	All to Taiwan.
Oxides	74	500	50	Republic of South Africa 228; Israel 50; North Korea 50.
Mercury	1	895	--	Republic of South Africa 550; India 265; Indonesia 80.

See footnotes at end of table.

Table 5.—Hong Kong: Exports and reexports of mineral commodities —Continued

(Metric tons unless otherwise specified)

Commodity	1979	1980	Destinations, 1980	
			United States	Other (principal)
METALS —Continued				
Nickel:				
Oxides and hydroxides -----	38	59	--	Taiwan 33; Republic of Korea 14; Singapore 9.
Metal including alloys, all forms ---	1,830	2,546	--	North Korea 846; Taiwan 740; Japan 228.
Platinum-group metals:				
Waste and sweepings				
value, thousands _	\$585	\$1,271	\$34	United Kingdom \$779; Switzerland \$310; Australia \$148.
Metal including alloys, unwrought and partly wrought _ troy ounces _	19,483	14,178	--	Taiwan 6,237; Japan 4,212; Switzerland 2,058.
Silver:				
Waste and sweepings				
value, thousands _	\$13,210	\$120,729	\$1,629	United Kingdom \$82,010; Switzerland \$12,236; West Germany \$11,721.
Metal including alloys, unwrought and partly wrought				
thousand troy ounces _	1,455	1,974	310	United Kingdom 859; Switzerland 430; Belgium 74.
Tin:				
Oxides and hydroxides _ kilograms _	--	881	--	North Korea 641; Taiwan 240.
Metal including alloys, all forms ---	1,818	2,405	255	Taiwan 738; China 414; Japan 212.
Titanium oxides and hydroxides _	1,878	2,529	--	Indonesia 1,753; Taiwan 541; China 96.
Tungsten:				
Ore and concentrate -----	--	425	--	Republic of South Africa 310; United Kingdom 115.
Metal including alloys, all forms ---	3	2	--	United Kingdom 1.
Zinc:				
Oxides and hydroxides -----	89	31	--	Indonesia 8; Nigeria 8; Madagascar 7.
Metal including alloys, all forms ---	2,979	6,834	--	U.S.S.R. 2,003; Netherlands 1,104; Japan 974.
Other:				
Ash and residue containing non-ferrous metals -----	540	737	(¹)	China 493; Taiwan 196; Japan 47.
Oxides, hydroxides, peroxides -----	239	242	--	Republic of Korea 190; Republic of South Africa 51.
Metals:				
Metalloids -----	16	11	5	Indonesia 5; Thailand 1.
Base metals including alloys, all forms -----	909	888	209	Belgium 366; Republic of South Africa 108; North Korea 77.
NONMETALS				
Abrasives, n.e.s.:				
Natural: Pumice, emery, corundum, etc -----	95	7	--	Indonesia 4; Japan 1; Malaysia 1.
Artificial: Corundum -----	440	188	--	Japan 169; Taiwan 10.
Dust and powder of precious and semi-precious stones ----- value _	\$4,099	\$61,298	\$50,559	Taiwan \$10,739.
Grinding and polishing wheels and stones -----	620	1,180	9	Indonesia 873; Nigeria 121; Philippines 44.
Asbestos, crude -----	1,844	8,492	--	United Arab Emirates 5,300; Indonesia 2,740; Republic of Korea 300.
Barite and witherite -----	98	679	--	Taiwan 492; Republic of Korea 141; Indonesia 45.
Boron materials: Oxide and acid -----	46	331	32	Philippines 200; Republic of Korea 85; Indonesia 9.
Cement -----	7,624	22,318	--	China 19,917; Macau 1,354; Vietnam 1,010.
Clays and clay products:				
Crude -----	59,968	78,748	150	Taiwan 63,625; Indonesia 10,494; Republic of Korea 3,700.
Products:				
Nonrefractory ² -----	4,399	4,275	7	Macau 3,092; China 629.
Refractory including nonclay brick --- value, thousands _	\$801	\$1,276	--	Indonesia \$698; Nigeria \$396; Philippines \$63.
Diamond:				
Gem, not set or strung --- carats _	371,004	292,034	35,338	Israel 59,079; Belgium 50,747; Japan 50,307.
Industrial ----- do _	12,355	26,102	4,275	Australia 8,954; China 5,000; Japan 3,000.
Diatomite and other infusorial earth	40	37	--	India 34; Taiwan 3.
Feldspar and fluorspar -----	13,249	15,406	--	Indonesia 10,495; Taiwan 4,893; Philippines 18.

See footnotes at end of table.

Table 5.—Hong Kong: Exports and reexports of mineral commodities —Continued

(Metric tons unless otherwise specified)

Commodity	1979	1980	Destinations, 1980	
			United States	Other (principal)
NONMETALS —Continued				
Fertilizer materials:				
Crude	805	738	6	Taiwan 535; Thailand 92; China 86.
Manufactured	32,306	43,586	4	China 35,973; Vietnam 5,253; Malaysia 1,604.
Ammonia	20	7	---	Vietnam 3; China 2.
Graphite, natural	817	161	---	Taiwan 128; Indonesia 17; Republic of Korea 14.
Gypsum and plasters	31,433	1,423	1	Indonesia 1,325; United Kingdom 77; Philippines 8.
Lime	47	39	---	Nigeria 25; Macau 10; China 4.
Magnesite	1,320	5,074	---	Taiwan 3,744; Nigeria 820; Indonesia 310.
Mica:				
Unworked including splittings and waste	104	36	---	Taiwan 34; Chile 1.
Worked including agglomerated splittings	27	15	(¹)	China 4; Italy 3; Sweden 3; Sri Lanka 2.
Pigments, mineral:				
Natural, crude	260	476	---	Indonesia 456; Philippines 20.
Iron oxides, processed	696	299	---	Indonesia 284; Malaysia 6.
Precious and semiprecious stones excluding diamond:				
Natural ----- value, thousands	\$172,908	\$143,740	\$34,431	Japan \$47,082; Singapore \$29,238; Switzerland \$10,508.
Synthetic and reconstructed - do.	\$1,508	\$1,143	\$432	Republic of Korea \$171; Taiwan \$143; Canada \$71.
Salt and brine				
Sodium and potassium compounds, n.e.s.:	52	21	---	Bahrain 18; China 2; Indonesia 1.
Caustic potash	5	170	---	Philippines 150; Taiwan 18; Indonesia 2.
Caustic soda	750	319	---	Philippines 129; China 56; Netherlands 53; Macau 41.
Soda ash	74	7,615	---	Indonesia 7,000; China 246; Taiwan 235.
Stone, sand and gravel:				
Dimension stone, crude and worked	3,043	2,520	13	Taiwan 1,286; Philippines 541; Indonesia 355.
Gravel and crushed rock	110	1,205	---	Indonesia 1,090; China 98; Nigeria 17.
Limestone excluding dimension	85	1	---	All to Canada.
Quartz and quartzite	668	224	---	Thailand 110; Ivory Coast 61; Nigeria 30.
Sand, not metal-bearing	16	48	---	Philippines 39; Republic of Korea 5; China 4.
Sulfur:				
Elemental, all forms	---	15	---	Macau 12; China 3.
Sulfuric acid	21	26	---	Indonesia 11; Philippines 6; China 3.
Talc, steatite, soapstone, pyrophyllite	8,908	5,302	---	Indonesia 4,166; Taiwan 910; Kampuchea 107.
Other:				
Crude	603	212	---	Taiwan 206; China 6.
Ash, slag, dross, not metal-bearing	---	3,400	---	All to Taiwan.
Halogens ----- kilograms	---	281	---	Indonesia 126; Singapore 100.
Oxides, hydrides, peroxides of strontium and barium	10	2	---	Mainly to Indonesia.
Building materials of asphalt, asbestos and fiber cements, unfired non-metals	653	473	---	Macau 228; Indonesia 102; China 66.
MINERAL FUELS AND RELATED MATERIALS				
Asphalt and bitumen, natural	373	23	---	All to Macau.
Carbon black and gas carbon	298	779	---	China 400; Indonesia 326; Singapore 51.
Coal, all grades including briquets	---	100	---	All to Macau.
Coke and semicoke	3	10	---	All to China.
Hydrogen, helium, rare gases ----- value	\$13,236	\$14,532	---	Singapore \$12,166; Vietnam \$1,194; China \$802.

See footnotes at end of table.

Table 5.—Hong Kong: Exports and reexports of mineral commodities —Continued

(Metric tons unless otherwise specified)

Commodity	1979	1980	Destinations, 1980	
			United States	Other (principal)
MINERAL FUELS AND RELATED MATERIALS—Continued				
Petroleum refinery products:				
Gasoline				
thousand 42-gallon barrels	70	81	--	All to Macau.
Kerosine and jet fuel	151	16	--	Do.
Distillate fuel oil	430	271	--	Macau 178; North Korea 93.
Residual fuel oil	431	869	--	Macau 470; China 399.
Lubricants	265	207	1	Taiwan 74; Indonesia 52; China 13.
Mineral jelly and wax	23	37	--	Philippines 11; Madagascar 8; Singapore 8.
Liquefied petroleum gas	33	25	--	Mainly to Macau.
Unspecified	12	27	--	Indonesia 17; Macau 5; Republic of Korea 2.
Mineral tar and other coal-, petroleum-, and gas-derived crude chemicals	6	4	--	Thailand 3; Philippines 1.

¹Revised.¹Less than 1/2 unit.²Excludes unreported quantity valued at \$137,749 in 1979 and \$352,364 in 1980.

Table 6.—Hong Kong: Imports of mineral commodities

(Metric tons unless otherwise specified)

Commodity	1979	1980	Sources, 1980	
			United States	Other (principal)
METALS				
Aluminum:				
Ore and concentrate	9,400	15,092	102	China 14,987.
Oxides and hydroxides	1,665	3,079	128	China 2,622; Japan 184; West Germany 146.
Metal including alloys, all forms	45,633	61,780	10,128	Canada 9,116; New Zealand 8,575; China 6,885.
Arsenic:				
Sulfides, natural	--	1	--	All from China.
Trioxide, pentoxide, acid	18	46	--	France 43; China 3.
Chromium:				
Ore and concentrate	--	5	--	All from Italy.
Oxides, hydroxides, acids	447	706	163	West Germany 291; China 151; Japan 64.
Cobalt oxides and hydroxides	18	18	--	China 9; United Kingdom 5; Belgium 4.
Copper:				
Sulfate	229	112	3	United Kingdom 49; China 36; France 18.
Oxides and hydroxides	181	167	29	West Germany 103; United Kingdom 18.
Metal including alloys, all forms	37,734	47,210	2,335	Japan 32,732; China 5,718; Taiwan 3,148.
Gold:				
Waste and sweepings				
value, thousands	\$1	\$1,290	\$490	Papua New Guinea \$693; Taiwan \$93; Malaysia \$8.
Metal including alloys, unwrought and partly wrought				
thousand troy ounces	3,395	1,153	16	Singapore 360; Switzerland 347; United Kingdom 305.
Iron and steel:				
Scrap	105,260	93,297	2,690	Japan 72,410; United Kingdom 5,031; Macau 4,140.
Pig iron, ferroalloys, similar materials	22,247	21,205	246	China 11,318; Australia 2,986; Japan 2,419; North Korea 2,407.
Steel, primary forms	257,267	156,083	52,524	Austria 52,487; Spain 30,400; Taiwan 8,219; China 4,421.
Semimanufactures	1,214	1,496	17	Japan 770; China 200; Taiwan 163.

Table 6.—Hong Kong: Imports of mineral commodities —Continued

(Metric tons unless otherwise specified)

Commodity	1979	1980	Sources, 1980	
			United States	Other (principal)
METALS—Continued				
Lead:				
Oxides and hydroxides -----	284	308	17	China 155; West Germany 72; Australia 38.
Metal including alloys, all forms ---	2,441	2,745	109	Canada 781; Taiwan 749; North Korea 512.
Magnesium metal including alloys, all forms -----	88	51	45	Canada 5.
Manganese:				
Ore and concentrate -----	1,000	374	--	China 265; Thailand 109.
Oxides and hydroxides -----	2,939	2,558	--	China 1,630; Japan 531; Singapore 360.
Mercury ----- 76-pound flasks.---	2,153	2,660	(¹)	China 2,586; Singapore 62.
Nickel:				
Oxides and hydroxides -----	82	254	--	Canada 193; Netherlands 45; France 12; China 4.
Metal including alloys, all forms ---	2,864	3,978	77	Canada 2,539; Republic of South Africa 477; Norway 295.
Platinum-group metals:				
Waste and sweepings ----- value.---	\$38,802	--		
Metals including alloys, all forms troy ounces.---	64,141	49,641	1,608	United Kingdom 14,146; West Germany 11,510; Australia 5,048.
Silver:				
Waste and sweepings value, thousands.---	\$1,299	\$142	\$31	Taiwan \$89; India \$18.
Metal including alloys, unwrought and partly wrought thousand troy ounces.---	850	1,353	8	Thailand 785; Singapore 134; Australia 106.
Tantalum metal including alloys, unwrought ----- kilograms.---	--	20	--	All from China.
Tin metal including alloys, all forms -----	2,416	2,065	24	Malaysia 1,118; China 634; Singapore 153.
Titanium:				
Ore and concentrate ² -----	141	481	27	Australia 382; Japan 51; Singapore 21.
Oxides and hydroxides -----	6,077	5,406	719	Japan 1,968; United Kingdom 617; Australia 564.
Tungsten:				
Ore and concentrate -----	--	425	--	All from China.
Metal including alloys, all forms -----	4	4	1	Japan 1.
Uranium and thorium compounds -----	4	6	1	France 5.
Zinc:				
Oxides and hydroxides -----	688	470	7	West Germany 113; Canada 108; China 78; France 78.
Metal including alloys, all forms ---	27,874	29,962	42	Australia 17,438; North Korea 7,772; Canada 2,010.
Other:				
Ash and residue containing non-ferrous metals -----	440	60	(¹)	China 59.
Oxides, hydroxides, peroxides -----	287	273	2	China 257; Japan 9.
Metals:				
Metalloids -----	60	34	3	China 30.
Base metals including alloys, all forms -----	1,239	1,253	60	China 238; Malaysia 236; Philippines 165; Taiwan 143.
NONMETALS				
Abrasives, n.e.s.:				
Natural: Pumice, emery, corundum, etc -----	666	1,396	400	Japan 484; China 421; Italy 75.
Artificial: Corundum -----	506	305	48	India 169; West Germany 48; China 20; Japan 19.
Dust and powder of precious and semi-precious stones ----- value.---	\$16,975	\$150,977	\$13,885	Japan \$104,947; Belgium \$13,055; United Kingdom \$6,732.
Grinding and polishing wheels and stones -----	2,696	2,405	44	China 1,333; Japan 561; Taiwan 292.
Asbestos, crude -----	1,844	8,776	--	Australia 5,800; China 2,779; Canada 177.
Barite and witherite -----	335	1,169	--	China 662; Taiwan 367; United Kingdom 80.
Boron materials: Oxide and acid.-----	307	242	120	China 118; United Kingdom 2.
Cement ----- thousand tons.---	2,575	3,220	(¹)	Japan 1,080; China 845; Republic of Korea 794.

See footnotes at end of table.

Table 6.—Hong Kong: Imports of mineral commodities—Continued

(Metric tons unless otherwise specified)

Commodity	1979	1980	Sources, 1980	
			United States	Other (principal)
NONMETALS—Continued				
Clays and clay products:				
Crude.....	50,613	89,499	1,370	China 72,336; Japan 9,888; Macau 4,530.
Products, nonrefractory and refractory including nonclay refractory brick ----- value, thousands ..	\$44,646	\$63,311	\$346	Italy \$17,947; China \$16,976; Japan \$9,732.
Cryolite and chiolite	11	9	--	All from Denmark.
Diamond:				
Gem, not set or strung thousand carats ..	1,055	1,291	73	India 499; Israel 323; Belgium 158.
Industrial	57	145	--	Australia 82; Belgium 37; Japan 23.
Diatomite and other infusorial earth	242	364	362	Singapore 2.
Feldspar and fluorspar	13,838	16,373	--	China 15,213; Indonesia 600; Japan 300.
Fertilizer materials:				
Crude	1,269	1,020	12	China 705; Canada 102; Belgium 54.
Manufactured:				
Nitrogenous	56,166	37,066	75	Republic of Korea 25,800; Japan 6,234; West Germany 3,784.
Other including mixed	8,039	8,454	43	West Germany 6,976; United Kingdom 893; Taiwan 420.
Ammonia	1,032	1,029	8	Japan 700; China 253; United Kingdom 36.
Graphite, natural	1,325	214	22	Sri Lanka 100; China 90; Switzerland 2.
Gypsum and plasters	132,726	86,119	45	West Germany 36,776; Japan 21,139; United Kingdom 19,829.
Lime	45,611	29,858	--	China 24,834; Taiwan 4,815.
Magnesite	2,672	8,493	1	China 7,500; Japan 825; Austria 102.
Mica:				
Crude including splittings and waste ..	65	31	--	India 21; United Kingdom 5; Republic of South Africa 4.
Worked including agglomerated splittings	520	437	4	Japan 405; India 11; Belgium 9.
Pigments, mineral:				
Natural crude	288	475	--	China 466; United Kingdom 8.
Iron oxides, processed	1,675	997	105	Japan 465; China 202; West Germany 126.
Precious and semiprecious stones excluding diamond:				
Natural ----- value, thousands ..	\$79,447	\$97,901	\$7,942	Singapore \$27,072; Thailand \$19,471; Sri Lanka \$7,791.
Synthetic ----- do.....	\$3,982	\$4,028	\$889	Japan \$1,156; West Germany \$1,032; Panama \$251.
Salt and brine	73,207	73,410	30	China 52,500; Taiwan 9,900; Thailand 3,659.
Sodium and potassium compounds, n.e.s.:				
Caustic potash	141	316	6	China 182; West Germany 49; Italy 36.
Caustic soda	17,066	20,284	743	China 7,268; United Kingdom 3,229; Republic of Korea 3,002.
Soda ash	25,932	29,126	712	East Germany 8,978; Japan 8,480; Kenya 4,217; China 3,221.
Stone, sand and gravel:				
Dimension stone:				
Crude and partly worked	1,328	2,765	--	China 1,928; Italy 402; Pakistan 225.
Worked	15,745	21,699	10	Italy 13,345; China 4,524; Taiwan 1,120.
Dolomite, chiefly refractory-grade ..	10	210	--	All from Taiwan.
Gravel and crushed rock	186,889	162,788	123	Macau 150,547; China 9,716; Japan 1,140.
Limestone except dimension	35,813	136,634	--	China 130,485; Japan 5,979; Taiwan 170.
Quartz and quartzite	2,130	2,475	--	China 2,350; Belgium 47; West Germany 35.
Sand excluding metal-bearing thousand tons ..	1,239	1,196	5	China 1,188.
Sulfur:				
Elemental, all forms	1,123	1,213	--	Japan 1,000; West Germany 177; Taiwan 35.
Sulfuric acid	3,006	2,692	17	Taiwan 1,471; China 932; West Germany 98.
Talc, steatite, soapstone, pyrophyllite ..	10,793	7,488	193	China 6,955; Norway 100; Taiwan 100.

See footnotes at end of table.

Table 6.—Hong Kong: Imports of mineral commodities —Continued

(Metric tons unless otherwise specified)

Commodity	1979	1980	Sources, 1980	
			United States	Other (principal)
NONMETALS—Continued				
Other:				
Crude:				
Meerschaum, amber, jet -----	--	2	--	All from Burma.
Unspecified -----	9,960	7,428	78	China 7,144; Republic of South Africa 125.
Slag, dross, similar wastes, not metal-bearing -----	929	689	--	China 407; Macau 145; Thailand 91.
Oxides, hydroxides, peroxides of barium, magnesium, strontium -----	5	9	2	Japan 7.
Halogens -----	(¹)	1	(²)	Mainly from Japan.
Building materials of asphalt, asbestos and fiber cements, unfired non-metals -----	19,683	18,787	1,307	United Kingdom 6,671; China 3,496; Australia 1,847.
MINERAL FUELS AND RELATED MATERIALS				
Asphalt and bitumen, natural -----	2,215	576	23	Republic of Korea 390; Taiwan 100; United Kingdom 53.
Carbon black and gas carbon -----	1,360	749	99	China 205; Japan 191; France 173.
Coal, all grades including briquets -----	5,814	2,851	10	China 1,445; Vietnam 1,000; Japan 387.
Coke and semicoke -----	6,749	5,571	--	Japan 4,646; Taiwan 601; United Kingdom 324.
Hydrogen, helium, rare gases value, thousands -----	\$274	\$263	\$6	Japan \$81; Singapore \$70; Republic of South Africa \$52.
Petroleum refinery products:				
Gasoline including natural thousand 42-gallon barrels -----	1,605	1,707	--	Singapore 1,279; China 411; Bahrain 17.
Kerosine and jet fuel ----- do -----	6,878	6,752	(¹)	Singapore 4,480; China 2,110.
Distillate fuel oil ----- do -----	9,419	8,470	--	China 5,603; Singapore 2,655; Australia 153.
Residual fuel oil ----- do -----	26,393	27,904	--	Singapore 23,751; China 1,928; Iran 1,037.
Lubricants ----- do -----	568	505	52	Japan 181; Singapore 123; China 65.
Mineral jelly and wax ----- do -----	126	110	4	China 93; Japan 7.
Other:				
Liquefied petroleum gas ----- do -----	1,252	1,224	--	Singapore 783; Taiwan 183; Japan 156.
Bitumen and other residues ----- do -----	136	178	3	Singapore 127; China 22; Republic of Korea 21.
Unspecified ----- do -----	2	40	1	China 32; Japan 4.
Mineral tar and other coal-, petroleum-, and gas-derived crude chemicals -----	878	1,672	98	China 1,285; Japan 178; United Kingdom 83; Denmark 28.

¹Revised.²Less than 1/2 unit.³Includes ores and concentrates of vanadium and columbium (niobium).**KAMPUCHEA¹⁷**

Kampuchea had no significant mineral production during 1981, and given the prevailing political, economic, and military situation, there was little likelihood of major development for several years to come.

Except for the main urban center of Phnom Penh and a few other provincial centers, the economic system of the country was reduced to subsistence agriculture and barter.

Military conflict continued with sufficient frequency and vehemence to preclude any realistic plans for industrial rebuilding

or the undertaking of new projects of any significant importance.

The goals for 1982 set forth by the Government reflected almost total lack of industrial or mineral production. The only nonagricultural items even mentioned were a planned catch of 60,000 tons of fish, restoration of 1,000 weaving looms, the transport of 385,000 tons of goods, and the generation of 114 million kilowatt-hours of power. The electric power plan for the entire country would equate to one power-plant of 20,000 to 25,000 kilowatts, operat-

ing at normal power factors.

The most significant mineral production may have been salt. In the first quarter of 1981, 10,700 tons of salt was produced, mostly from the evaporation pans in Kampot Province. Yearly production probably increased over the 1980 output.

One small phosphate plant was reported operational in 1981. This was the Mongkol Borei grinding plant, which had produced 700 tons of fertilizer by midyear. The plant grinds the phosphate ore for direct applica-

tion to crops.

There was a small gem stone mining industry along the Thai-Kampuchea border where it meets the Gulf of Thailand. People from Thailand reportedly were crossing the border to dig for rubies in a gravel deposit. The practice was discouraged in October when a reported 30 Thai gem stone miners were killed by Vietnamese troops.

Some local production of construction materials was underway, but no estimates of production were available.

NORTH KOREA¹⁸

During 1961-80, Pyongyang claimed that industrial output grew at an average annual rate of 14.5% while output had jumped to 15% to 17% for the 1978-80 period. Based on projections for the 1981 budget, overall economic growth for 1981 was expected to be about 7% compared with an estimated rate of growth of 9.5% for 1980. In the first 3 years of the current economic plan, most of the objectives for industrial construction were completed. By the end of the plan period, there was to be annual production of 56 to 60 billion kilowatt-hours of electricity, 70 to 80 million tons of coal, 16 million tons of iron ore, 7.4 to 8.0 million tons of steel, 1.0 million tons of nonferrous metals, 12 to 13 million tons of cement, and 5 million tons of chemical fertilizers.¹⁹

The Government of North Korea has never published figures on mineral output; thus, all figures published by the U.S. Bureau of Mines and other organizations concerned with world mineral production are estimates and should generally be regarded as indicative only of the order of magnitude of production of the commodities, not as precisely computed estimates. Estimates for 1977-80 are unaltered from those published in the 1980 edition of this chapter except as noted in the following summary of 1981 production levels; the figures presented are in thousand metric tons unless otherwise specified: aluminum, primary ingot—10; cadmium, smelter output (metric tons)—150; copper, mine output, metal content—15; copper, smelter, primary and secondary—18; copper, refined, primary and secondary—22; gold, mine output, metal content (troy ounces)—160,000; iron ore, marketable, gross weight—8,000 (iron content, 3,200); pig iron—3,000; ferroalloys—120; crude steel—

3,500; steel semimanufactures—3,300; silver, mine output, metal content (troy ounces)—1,550,000 (1980 revised to 1,600,000); tungsten, mine output, metal content (metric tons)—2,200; zinc, mine output, metal content—140; zinc, primary metal—120; barite—110; cement—8,000; fluorspar—40; graphite—25; lime—400; magnesite, crude—1,900; magnesite, calcined—800 (1980 revised to 800); nitrogen content of ammonia—450; phosphate rock—550; pyrites—620; salt—570; sulfur—265 (including 255 from pyrites and 10 from metallurgical byproduct); talc—170; coal—45,000 (including 36,000 anthracite, 8,800 bituminous, and 200 lignite); coke—3,000.

North Korea's leading mineral commodity mined is coal, mostly anthracite. The leading metal ore mined is magnetite. Kim Chaek is the largest iron and steel works in North Korea. The country is a significant producer of lead and zinc from mine ore and refined metal from smelters at Munpyong and Nampo. Mine production of magnesite is of world significance. Barite, mined from several locations in the western part of the country, has been exported on a long-term barter basis. Status of a 20,000-ton-per-year aluminum reduction plant installed in the 1970's remains unknown. Official data on mineral and metal production in North Korea are not available from the Pyongyang Government.²⁰

The Pyongyang Government does not disseminate trade transaction data. The country's trade data were constructed from data published by North Korea's trading partners that publicly distribute their own trade information.

North Korea's foreign trade was estimated to be as follows, in million dollars:

	Exports	Imports
1970	315	395
1971	316	552
1972	386	617
1973	482	779
1974	700	1,300
1975	755	1,075
1976	555	825
1977	675	781
1978	1,027	950
1979	1,270	1,300

Starting in the mid-1970's, Pyongyang became delinquent in loan payments for plant purchases and, in some cases, was simply unable to make payments. Negotiations with creditors deferred repayment of the outstanding debts to 1983-84, with current installments covering only those loans in arrears and the interest. The country's biggest problem was to earn foreign currency to meet its obligations. In addition, Government trade representatives reportedly have approached foreign companies on setting up joint ventures in North Korea in return for a portion of the goods manufactured.²¹

To attain the output goals of the current economic plan, the Government continued the education and training of personnel in geologic expertise to insure prospecting for expanding the country's mineral reserve base, to discover new mineral deposits, and to develop new mining operations. Special efforts were to be directed to find deposits of metal ores necessary for the iron and steel industry.

Musan iron ore mines, one of the largest iron mines in North Korea, was being expanded to an annual output of 10 million tons. Experimental blasting techniques were being employed at the time to remove overburden to expose the underlying ore body. A long-distance belt-conveyor transport line was constructed, and a new ore dressing plant installed, raising ore dressing capacity 60%.

By 1984, Government plans called for an annual steel output of 7.4 to 8.0 million tons, later to be expanded by the end of the decade to 15 million tons. North Korea's largest integrated steel works are Kim Chaek and Hwanghae. Kim Chaek has two 1,000-cubic-meter blast furnaces and one 1,500-cubic-meter blast furnace. The No. 2 blast furnace was being enlarged to 1,500 cubic meters. Remodeling of the sintering furnace and modernization of the chemical shop was in progress. Conservation techniques were introduced at Kim Chaek to

reduce coke consumption and overall fuel consumption. Hwanghae has three 1,000-cubic-meter blast furnaces; overhaul of furnaces Nos. 2 and 3 were completed in 1981. Production of thick plate was increased 1.3 times by changes to the rolling process. Quality control in the thin plate and wire shops raised the product utilization rate. Also, adjustments in the heating cycle reportedly reduced coke consumption per ton of steel produced while raising the fuel utilization level.

The Government's planned objective by the mid-1980's was to produce 1.5 million tons of nonferrous metals annually. North Korea was a prominent producer of lead and zinc; Komdok Mine in Tanchan was the country's largest producer. Both ore and concentrates and refined metals have been exported. Because of higher values, increased tonnages of lead and zinc metal have been exported more recently rather than concentrate. Smelter-refining facilities at Hamhung, Munchon, and Nampo produce lead and zinc metals as well as copper. Additional copper smelter facilities were at Haeju and Tanchon.

The 1984 target for annual cement production was projected at 12 to 13 million tons, which was to be expanded to 20 million tons by the end of the decade. North Korea's largest cement plants were at Chonnaeri, Madong, and Sunchon. Construction of a new plant using modern calcining technology was nearing completion. Size of plant and location were not disclosed.

The Government's target for chemical fertilizer output was projected at 5 million tons per year by 1984. Hungnam Combined Fertilizer Enterprise was the largest producer in North Korea, producing primarily nitrogenous and phosphatic fertilizers.

Lacking oil and natural gas, North Korea had coal as its chief fuel source. The country has coal resources estimated at nearly 10 billion tons; anthracite comprises 70% of the country's resources. The largest anthracite deposit, identified as the Northern Coalfield, is in South Pyongan Province, while 70% of the lignite occurrence is in the east coast district, North Hamgyong Province.

Lignite production was from wholly mechanized mines, while anthracite mines were mechanized to the extent of about 40% to 50%. The mines around Anju in the western coalfield account annually for

about 15 million tons of total production. Numerous small mines account for 20 million tons, and the remainder from mines with annual output capacity over 21 million tons in South Pyongan, North Hwanghae, North Hamgyong, South Hamgyong, and Kowon. Most of the country's output was for domestic consumption; however, some coal was exported. The bulk of the coal consumed was for steam generation and space heating.

The 1984 target output for coal was 70 to 80 million tons, to be increased to 120 million tons by 1989. To attain these goals, Government allocations to the coal sector increased 22% in 1978, 33.3% in 1979, 30% in 1980, and 25% in 1981. During this time, the mining complexes particularly at Anju, Sunchon, Tokchon, and Kujang were expanded, construction of a large colliery at Inpo was completed, and several new coal mines were commissioned.

Table 7.—North Korea: Apparent exports of mineral commodities¹

(Metric tons unless otherwise specified)

Commodity	1979	1980 ^a	Destinations, 1980	
			United States	Other (principal)
METALS				
Aluminum metal including alloys:				
Scrap	--	7	--	All to Italy.
Unwrought	--	73	--	All to Saudi Arabia.
Semimanufactures	316	2,706	--	Do.
Cadmium metal including alloys, all forms				
	83	55	--	All to West Germany.
Copper metal including alloys:				
Scrap	--	79	--	Do.
Unwrought	23	5	--	All to Japan.
Semimanufactures	11	5	--	All to Saudi Arabia.
Iron and steel:				
Scrap	--	1,727	--	All to Indonesia.
Pig iron, cast iron, powder, shot	51,508	66,018	--	Japan 49,349; Saudi Arabia 14,262.
Ferroalloys	3,117	7,118	--	U.S.S.R. 5,613; Japan 1,505.
Steel, primary forms	113,709	82,947	--	Greece 32,914; Thailand 29,083; Indonesia 13,584.
Semimanufactures:				
Bars, rods, angles, shapes, sections	39,149	92,256	--	Saudi Arabia 90,481; Singapore 655; Colombia 550.
Universals, plates, sheets	41,492	62,782	--	Japan 34,431; Hong Kong 8,691; Dominican Republic 5,793.
Hoop and strip	80	200	--	Sri Lanka 151; Indonesia 30; Saudi Arabia 12.
Rails and accessories	998	1	--	All to Saudi Arabia.
Wire	2,566	1,929	--	Saudi Arabia 1,769; Sri Lanka 100.
Tubes, pipes, fittings	17,398	216,756	--	Saudi Arabia 15,212; Hungary 962; Dominican Republic 522.
Castings and forgings, rough	1,498	180	--	Saudi Arabia 125; Sweden 55.
Lead metal including alloys:				
Scrap	682	NA	--	NA.
Unwrought	27,355	40,719	--	Japan 22,485; West Germany 8,883; France 4,486.
Semimanufactures	4	NA	--	NA.
Silver metal including alloys, unwrought and partly wrought				
value, thousands	\$34,099	\$58,373	--	West Germany \$49,573; Italy \$8,783.
Tin metal including alloys, semimanufactures				
	--	10	--	All to Indonesia.
Tungsten metal including alloys, all forms				
	--	1	--	All to Japan.
Zinc:				
Ore and concentrate	64,704	54,488	--	Japan 50,717; Yugoslavia 3,771.
Metal including alloys, unwrought	51,511	49,247	--	Japan 32,110; Hong Kong 7,772; France 4,574.
Other, n.e.s.:				
Ash and residue containing non-ferrous metals	4,068	4,955	--	Japan 4,835; Spain 120.
Oxides, hydroxides, peroxides	--	13	--	All to Japan.
NONMETALS				
Abrasives: Grinding and polishing wheels and stones				
	26	42	--	All to Saudi Arabia.
Barite and witherite	9,521	3,842	--	All to Algeria.
Cement	304,264	571,587	--	U.S.S.R. 481,000; Saudi Arabia 45,227; Hong Kong 24,233.

See footnotes at end of table.

Table 7.—North Korea: Apparent exports of mineral commodities¹ —Continued

(Metric tons unless otherwise specified)

Commodity	1979	1980 ^P	Destinations, 1980	
			United States	Other (principal)
NONMETALS —Continued				
Clays and clay products:				
Crude:				
Chamotte earth -----		189	--	All to Hungary.
Kaolin -----	26,400	20,100	--	All to Japan.
Other, unspecified -----	101	64	--	West Germany 63.
Products:				
Nonrefractory -----	313	136	--	Saudi Arabia 120; Sweden 12.
Refractory -----	754	(^Q)	--	All to Malta.
Diamond:				
Gem, not set or strung				
value, thousands -----		\$18	--	All to Spain.
Industrial ----- do -----	\$43	NA	--	NA.
Feldspar, fluorspar, etc -----	3,561	7,899	--	All to Poland.
Fertilizer materials, manufactured:				
Nitrogenous -----	26,815	26,004	--	U.S.S.R. 20,469; Singapore 5,505.
Other including mixed -----	2	500	--	All to Malta.
Graphite, natural -----	24,478	10,684	--	Japan 8,926; Austria 1,758.
Gypsum and plasters -----	102	NA	--	NA.
Lime -----	299	NA	--	NA.
Magnesite including powder -----	757,787	793,955	--	U.S.S.R. 500,608; Poland 141,641; Japan 105,323.
Precious and semiprecious stones:				
Natural ----- value, thousands -----				
	\$12	\$84	--	Singapore \$82.
Synthetic ----- do -----				
	--	\$1	--	All to Japan.
Pyrites, unroasted -----	15	NA	--	NA.
Salt and brine -----	58	113	--	All to Saudi Arabia.
Sodium and potassium compounds,				
caustic soda -----	--	252	--	Indonesia 250.
Stone, sand and gravel:				
Dimension stone:				
Crude and partly worked -----				
	11,573	9,559	--	All to Japan.
Worked -----				
	172	63	--	All to Saudi Arabia.
Dolomite, chiefly refractory-grade -----	--	300	--	All to Indonesia.
Gravel and crushed rock -----	3,038	192	--	All to Japan.
Quartz and quartzite -----	1,565	1,833	--	Do.
Sand excluding metal-bearing -----	--	2	--	All to Saudi Arabia.
Sulfur, elemental, other than colloidal -----	--	100	--	All to Indonesia.
Talc and steatite -----	74,546	45,210	--	Japan 33,538; Poland 11,672.
Other, n.e.s.:				
Crude -----				
	1,000	3,500	--	Hungary 2,000; Japan 1,500.
Slag, dross, similar waste, not metal-bearing -----				
	--	5	--	All to Saudi Arabia.
MINERAL FUELS AND RELATED MATERIALS				
Coal, anthracite and bituminous -----	56,782	100,233	--	Japan 100,223.
Petroleum refinery products:				
Kerosine and jet fuel				
42-gallon barrels -----	132	NA	--	NA.
Residual fuel oil ----- do -----	--	130,389	--	All to Japan.
Lubricants ----- do -----	147	1,274	--	All to Saudi Arabia.
Other:				
Liquefied petroleum gas				
do -----	35	NA	--	NA.
Bitumen and other residues				
do -----	1,297	NA	--	NA.
Bituminous mixtures				
do -----	418	NA	--	NA.
Mineral tar and other coal-, petroleum-, and gas-derived crude chemicals -----	182	602	--	All to Japan.

^PPreliminary. NA Not available.^QOwing to a lack of official trade data published by North Korea, this table should not be taken as a complete presentation of this country's mineral trade. Unless otherwise specified, these data have been compiled from United Nations information and data published by the partner trade countries.^RExcludes part of Canadian imports valued at \$137,000.^SReported value of imports by Malta was \$33,000.

Table 8.—North Korea: Apparent imports of mineral commodities¹

(Metric tons unless otherwise specified)

Commodity	1979	1980 ^P	Sources, 1980	
			United States	Other (principal)
METALS				
Aluminum:				
Oxides and hydroxides -----	2	11	--	All from Japan.
Metal including alloys:				
Unwrought -----	810	2,158	--	Hungary 1,204; Singapore 531; Yugoslavia 423.
Semimanufactures -----	493	704	--	Japan 548; Austria 109.
Antimony metal, elemental -----	2	NA	--	NA.
Chromium:				
Chromite -----	7,000	19,426	--	U.S.S.R. 15,000; Japan 4,426.
Oxides and hydroxides -----	70	37	--	All from Japan.
Cobalt:				
Oxides and hydroxides -----	25	1	--	Do.
Metal including alloys, all forms -----	2	4	--	Singapore 3; France 1.
Copper:				
Ore and concentrate -----	4,307	7,702	--	All from Philippines.
Matte -----	110	NA	--	NA.
Metal including alloys:				
Scrap -----	83	NA	--	NA.
Semimanufactures -----	187	59	--	Japan 53; Switzerland 6.
Iron and steel:				
Ore and concentrate -----	--	111,246	--	All from Brazil.
Metal:				
Pig iron, cast iron, powder, shot -----	--	11,011	--	Indonesia 11,000.
Ferrous alloys -----	5,409	11,505	--	Japan 11,376.
Steel, primary forms -----	--	65	--	All from Japan.
Semimanufactures:				
Bars, rods, angles, shapes, sections -----	3,351	² 15,310	--	Japan 7,820; ² Italy 7,380.
Universals, plates, sheets -----	19,776	17,733	--	Japan 17,722.
Hoop and strip -----	117	³ 148	--	All from Japan. ³
Rails and accessories -----	932	4,956	--	Do.
Wire -----	1,049	⁴ 100	--	Japan 53; ⁴ Austria 47.
Tubes, pipes, fittings -----	6,833	10,521	--	Japan 9,749; West Germany 351; Singapore 207.
Lead metal including alloys:				
Unwrought -----	--	⁵ 50	--	All from Mexico.
Semimanufactures -----	149	4	--	All from Japan.
Magnesium metal including alloys:				
Unwrought -----	12	30	--	Do.
Semimanufactures -----	157	NA	--	NA.
Manganese:				
Ore and concentrate -----	21,000	29,100	--	U.S.S.R. 29,000.
Oxides and hydroxides -----	252	350	--	Singapore 250; Japan 100.
Molybdenum:				
Ore and concentrate -----	--	43	--	All from Singapore.
Metal including alloys, all forms ----- kilograms -----	--	284	--	All from Japan.
Nickel:				
Ore and concentrate -----	60,067	NA	--	NA.
Metal including alloys:				
Unwrought -----	82	NA	--	NA.
Semimanufactures -----	7	3	--	All from Japan.
Platinum-group metals including alloys, unwrought and partly wrought value, thousands -----	\$49	\$233	--	West Germany \$173; Japan \$60.
Silver:				
Ore and concentrate ----- do -----	\$246	NA	--	NA.
Metal including alloys, unwrought and partly wrought ----- do -----	--	\$34	--	France \$27; Japan \$7.
Tantalum metal including alloys, all forms ----- kilograms -----	15	5	--	All from Japan.
Tin metal including alloys:				
Unwrought -----	12	52	--	All from Singapore.
Semimanufactures -----	2	5	--	Singapore 3; Japan 2.
Titanium:				
Oxides -----	56	52	--	All from Japan.
Metal including alloys, all forms -----	2	6	--	Do.
Tungsten metal including alloys, all forms -----	--	⁶ 40	--	All from Singapore.

See footnotes at end of table.

Table 8.—North Korea: Apparent imports of mineral commodities¹—Continued

(Metric tons unless otherwise specified)

Commodity	1979	1980 ^P	Sources, 1980	
			United States	Other (principal)
METALS—Continued				
Vanadium ore and concentrate	--	45	--	All from Singapore.
Zinc:				
Ore and concentrate	20,419	59,661	--	All from Peru.
Oxides and hydroxides	--	1	--	All from Japan.
Metal including alloys, semimanufactures	533	141	--	Japan 111; Singapore 30.
Other, n.e.s.:				
Oxides, hydroxides, peroxides	98	34	--	Japan 18; Singapore 12.
Metalloids	1	7	--	All from Japan.
Base metals including alloys, all forms	--	10	--	All from Singapore.
NONMETALS				
Abrasives:				
Dust and powder of precious and semiprecious stones				
value, thousands	\$27	\$20	--	All from Japan.
Grinding and polishing wheels and stones	12	12	--	Do.
Boric oxide and acid	--	19	--	Do.
Clays and clay products:				
Crude	300	NA	--	NA.
Products:				
Nonrefractory	91	760	--	Italy 52.
Refractory	4,132	4,137	--	All from Japan.
Diamond, industrial value, thousands	\$28	NA	--	NA.
Diatomite and other infusorial earth	3	2	--	All from Japan.
Fertilizer materials:				
Crude, phosphatic - thousand tons	*325	80	--	All from Algeria.
Manufactured:				
Nitrogenous	100	NA	--	NA.
Potassic	83,474	82,901	--	All from U.S.S.R.
Other including mixed	--	2	--	All from Japan.
Ammonia	--	6	--	Do.
Mica:				
Crude including splittings and waste	(*)	3	--	Do.
Worked including agglomerated splittings	--	2	--	Do.
Pigments, mineral: Iron oxides and hydroxides, processed	--	(*)	--	Do.
Precious and semiprecious stones:				
Natural	\$12	\$6	--	Do.
Synthetic	\$72	\$12	--	Do.
Salt and brine	338	21,113	--	Egypt 21,000; Japan 113.
Sodium and potassium compounds:				
Caustic potash	1	1	--	All from Japan.
Caustic soda	48	3	--	Do.
Soda ash	2	(*)	--	Do.
Stone, sand and gravel:				
Dimension stone:				
Crude and partly worked	30	NA	--	NA.
Worked	175	211	--	All from Italy.
Gravel and crushed rock	--	37	--	Do.
Sand excluding metal-bearing	4	NA	--	NA.
Sulfur:				
Elemental:				
Other than colloidal	4	22,975	--	Poland 21,000; Singapore 1,972.
Colloidal	--	2,420	--	All from Singapore.
Sulfuric acid	3	6	--	All from Japan.
Other, n.e.s.:				
Crude	3	37	--	Do.
Halogens	--	5	--	Do.
MINERAL FUELS AND RELATED MATERIALS				
Asphalt and bitumen, natural	9	1	--	Do.
Carbon black	544	2,452	--	West Germany 1,936; Japan 516.
Coal, anthracite and bituminous	15,400	NA	--	NA.
Coke and semicoke	185,536	246,181	--	Japan 150,181; Poland 96,000.
Hydrogen, helium, rare gases	--	4	--	All from Japan.
Peat including briquets	12	NA	--	NA.

See footnotes at end of table.

Table 8.—North Korea: Apparent imports of mineral commodities¹ —Continued

(Metric tons unless otherwise specified)

Commodity	1979	1980 ^P	Sources, 1980	
			United States	Other (principal)
MINERAL FUELS AND RELATED MATERIALS —Continued				
Petroleum refinery products:				
Kerosine and jet fuel				
42-gallon barrels...	3,736	729	--	Yugoslavia 380; Madagascar 349.
Distillate fuel oil ----- do.	7,475	89,595	--	Singapore 89,274; Yugoslavia 298.
Residual fuel oil ----- do.	148,105	4,156	--	Yugoslavia 4,123.
Lubricants ----- do.	17,745	¹⁰ 13,062	--	Singapore 12,733; Belgium-Luxembourg 126; Japan 126. ¹⁰
Other:				
Mineral jelly and wax ----- do.	--	1,865	--	All from Japan.
Nonlubricating oils ----- do.	--	133	--	All from Singapore.
Bitumen and other residues ----- do.	--	91	--	All from Japan.
Bituminous mixtures ----- do.	--	970	--	Do.
Mineral tar and other coal, petroleum, and gas-derived crude chemicals -----	--	100	--	Do.

^PPreliminary. NA Not available.

¹Owing to a lack of official data published by North Korea, this table should not be taken as a complete presentation of this country's mineral trade. Unless otherwise specified, these data have been compiled from United Nations information and data published by the partner trade countries.

²Excludes part of Japanese exports valued at \$289,000.

³Excludes part of Japanese exports valued at \$168,000.

⁴Excludes part of Japanese exports valued at \$516,000.

⁵Metalgesellschaft Aktiengesellschaft (Metallstatistik), Frankfurt am Main, West Germany.

⁶Excludes exports from Japan valued at \$6,000.

⁷Excludes exports from Japan valued at \$184,000.

⁸Statistical supplement, British Sulphur Corp. Ltd., London, United Kingdom.

⁹Less than 1/2 unit.

¹⁰Excludes part of Japanese exports valued at \$1,149,000.

LAOS²²

The year 1981 marked the beginning of a new 5-year plan in the Lao People's Democratic Republic. Some signs of economic growth and agricultural and industrial progress were seen. For the first year in more than a decade, the Laotians were self-sufficient in food supplies. Some surplus agricultural goods were available for export, and some raw materials for industrial production were also produced. There remained an imbalance of trade, however, with the continuing necessity of exporting only raw materials and importing finished goods. The Government reported an overall increase of 8.6% in national production compared with that in 1980.

At yearend, Government officials announced that efforts to develop new mineral deposits would be stepped up. Repair and establishment of industrial enterprises would be increased, including rehabilitation of the remaining equipment at the Nam Ngum hydroelectric plant with the view toward expanding the electric power network. They further stated that repair and development of the tin mining industry at Phontiou would be continued.

Though several industrial plants encountered difficulties, including shortages of raw materials and spare parts, and lack of experience in production management, overall industrial production reportedly increased more than 13% compared with that of the previous year. Production targets for 1981 were fulfilled in the areas of electricity, coal, gypsum, and brick. It was predicted that overall national production in 1982 would increase by 16% with electric power output increasing 1%; tin production, 100%; and construction materials, by 44%.

The problem of inadequate transportation facilities continued throughout 1981. One of the main objectives of the new 5-year plan was the restoration and improvement of most of the old highway system that was destroyed or allowed to become impassable over the past decade. To this end, an agreement was signed in October 1981 between Vietnam and Laos regarding transport issues and goods exchange and payments. Highway No. 9 between Vietnam and the Phin District of Savannakhet Province was being reconstructed and was expected to eventually meet international standards.

The 250-kilometer road should greatly facilitate the transportation of exported minerals and other goods when completed.

The hydroelectric powerplant project at Nam Ngum Dam north of Vientiane continued to be one of the few foreign exchange earners for Laos. The electricity generated reportedly was 807 million kilowatt-hours during 1981, over three-fourths of which was exported to Thailand under a long standing trade agreement. During October 1981, the Electricity Generating Authority of Thailand and Lao State Electricity Enterprise concluded an agreement on a new price for the electricity exported. The new price reportedly was triple the former charges.

For many years, the Nam Ngum powerplant has operated with two functioning generators, Nos. 3 and 4, each with a 40,000-kilowatt capacity. At yearend, it was reported that generators Nos. 1 and 2, each with a 15,000-kilowatt capacity, were ready to be restarted. A fifth generator, previously believed to be under construction, was contracted for during September 1981 with the Southeast Asian affairs division of Switzerland's Motor Columbus Enterprises.²³

COMMODITY REVIEW

During 1981, the Soviet-assisted survey and exploration of tin resources in the Pa Then Basin continued. The old established tin mine at Phontiou was known to be operating, although production figures have been unavailable for many years. Other tin deposits being surveyed included Mong Seun, Neng, and Boneng. According to the senior Soviet scientist, the occurrences were very rich, the tin content in some places reportedly being as high as 85% cassiterite. By yearend 1981, 70% of the Pa Then Basin had been surveyed. The Soviet survey was scheduled for completion in 1983.²⁴

Minerals other than tin have been reported throughout the country and several were believed rich enough to be exploited if

capital funding and an assured market were available. Iron deposits were known in several places, the most important being at Lalbouak and Phonlek in Xiang Khoang Province.

Gold deposits were scattered throughout the country. Copper deposits were surveyed in several locations, most notably in the Sing District, Louang Province. Gem stones were reported in Honei Sai District, including a sapphire deposit reportedly being mined with Czechoslovakian assistance. The salt farms, drilled brine wells, in the Thonlaakhom District of Vientiane Province continued in operation and supplied domestic needs.

Construction materials for local use were produced during 1981. The production of brick reportedly was increased 133% over 1980 levels. A protocol and memorandum on the construction of a brick plant, funded by the Soviet Union, were signed in Vientiane in July 1981. According to the agreement, the Soviets were to build a plant with a capacity of 7 to 12 million bricks per year.

The gypsum mining operation at the Dong Hen Quarry in southern Savannakhet Province completed its first full year of operation. The mine, run jointly by Laos and Vietnam, produced 40,500 tons during 1981. Most of the output was exported to Vietnam for use in its cement industry.

Petroleum and gas deposits were reported as being located in the Se Pon District of Savannakhet Province as a result of recent mineral surveying. Also reported were occurrences of oil shale. No plans had been made at yearend to drill or exploit these resources. Laos continued to import the small amount of petroleum products needed from Thailand and Vietnam.

In October 1981, Laos signed an agreement with the U.S.S.R. for the construction of a petroleum pipeline between the Vietnamese districts of Vinh and Vientiane. The Soviets will assist in the technical aspects of the 465-kilometer pipeline.

MONGOLIA²⁵

Mongolia covers a land area of 1,564,619 square kilometers; about 89% is pasture or desert wasteland, 10% forested, and less than 1% arable. The population was estimated at 1.7 million in 1981. The total work force was about 315,000, 21.4% was in commerce and services, 21% in manufacturing, 11.9% in agricultural and fishing, 7.2% in

construction, and 38.5% in government and public authorities. Mongolia is a member of the Council for Economic Mutual Assistance (CEMA). It is also a member of the Economic and Social Commission for Asia and the Pacific.

The Mongolian economy, traditionally an agrarian economy, was to transform into an

agricultural-industrial economy under the sixth 5-year plan (1976-80). During this period, Mongolia reportedly had invested over \$4 billion²⁶ into its national economy. The Mongolian major industrial center is in Ulan Bator (the national capital) area. Three additional new industrial areas are in Darhan, Erdenet, and Choybalsan. Mongolian main industries include processing of animal products such as leather, woolen textiles, and processed meat, and mining of copper, molybdenum, fluorspar, limestone, construction aggregates, and coal. Most industries in Mongolia remained small in scale, but their share of the country's GNP has increased substantially over the past years. The output of industry accounting for 14% of the country's national income in the 1960's rose to about 30% in 1980.

Under the seventh 5-year plan (1981-85), Mongolia was to accelerate the development of the fuel and power, mining, and building industries; to extend further development of light and food industries; and to emphasize the development of state farms and the extension of the arable area. Under a new agreement signed between Mongolia and the U.S.S.R. in June 1981, the Soviet Union was to continue its technical and economic assistance to Mongolia. In the mining sector, special emphases were placed on the continuing expansion of the Erdenet copper-molybdenum mining and concentrating combine, the continuing exploration of zinc deposits in Salkhit, and the development of fluorspar mining and concentrating capacities at Boro-onдор, in southeastern Mongolia. During the 1981-85 period, Mongolia was also to complete exploration works for the copper-molybdenum deposit at Tsagaan-suvraga, coking coal deposit at Tavan-tolgoi, and the phosphate deposit at Burenhaan.

In 1980, Mongolian merchandise exports were valued at \$364.7 million, and imports were valued at \$495.9 million. Mongolian exports of food and agricultural products accounted for about 63.3% of total exports, while exports of minerals accounted for about 26.4%. Mongolian imports of machines and equipment, spare parts, and manufactured consumer goods accounted for over 60% of total imports. About 98% of merchandise trade was with the CEMA countries. The U.S.S.R. alone accounted for 80% of Mongolian total exports and accounted for 90% of Mongolian total imports. Mongolia has been suffering from a

chronic trade deficit. However, the trade deficit decreased to about \$131.2 million in 1980 from \$137.4 million in 1979 because of the increased export earnings from minerals in 1980.²⁷

COMMODITY REVIEW

Metals.—Mongolian mine production of copper and molybdenum at Erdenet increased substantially in 1981. The copper and molybdenum complex, initiated in 1974, is a 50-50 Soviet-Mongolian venture project. The total investment in the project was estimated at 1 billion rubles (about US\$1.5 billion). The output of ore increased to about 8 million tons in 1981 from about 4 million tons in 1979. The output of ore was projected to reach 16 million tons at full capacity when the fourth phase construction work is completed in 1985.²⁸ The estimated mine output of contained copper and molybdenum in concentrates at Erdenet for 1979 to 1981 and projected 1985 at full capacity is as follows in tons:²⁹

	1979	1980	1981	Projected 1985
Copper -----	21,700	44,000	71,800	118,000
Molybdenum-----	222	487	661	1,000

The ore reserves at Erdenet were estimated at 300 million tons, averaging 0.85% copper and 0.012% molybdenum. The existing complex at Erdenet comprised an open pit mine, a concentrator, a machine repair plant, and auxiliary shops. The complex employed about 2,600 workers; about 55% of the employees are Mongolian and the remainder are specialists from the U.S.S.R.

Nonmetals.—Mongolian cement production at Darhan was expected to increase by 18% from 177,900 tons reported in 1980. The mine production of fluorspar at Berh and two other mines continued to increase in 1981. All fluorspar produced in Mongolia was exported to the U.S.S.R. Under the seventh 5-year plan, a large fluorspar mining and concentrating combine was expected to be built at the Boro-onдор area, where a promising fluorspar deposit was discovered in recent years. To export the future output of fluorspar from the area to the U.S.S.R., a new branch line from Dаланjargalau to Boro-onдор on the Trans-Mongolian railway will also be constructed.

According to the Mongolian Planning

Commission, the Government planned to undertake further exploration work of the Burenkhan phosphate deposit discovered around Lake Khubsugul in northern Mongolia in 1964. The phosphate ore reserves in the area were estimated at 400 million tons in 1970.³⁰

Mineral Fuels.—Coal production in Mongolia remained at the 4.5-million-ton level. Major coal-producing areas are around the Ulan Bator area and in Darhan. During the sixth 5-year plan (1976-80), the Nalayha

Kapitalnaya Mine was expanded in the Shariyn Gol area, and a new open pit coal mine with an annual capacity of 2 million tons was being developed at Baga-Nuur. Other promising coal deposits in Mongolia include Tavan-tolgoy, Adunchulun, and Uvdun-khudag. Most of the Mongolian coal is of Permian age. About 80% of the existing coal reserves are black coal, of which about 50% can be used in the coking industry, and about 20% is brown coal.

Table 9.—Mongolia: Apparent exports of mineral commodities¹

(Metric tons unless otherwise specified)

Commodity	1979	1980 ^P	Destinations, 1980	
			United States	Other (principal)
Cement.....	² 27,800	² 6,800	--	All to U.S.S.R.
Iron and steel metal:				
Scrap.....	20,000	20,007	--	Do.
Semimanufactures:				
Tubes, pipes, fittings.....	188	1	--	All to Saudi Arabia.
Castings and forgings, rough....	211	2	--	Do.

^PPreliminary.

¹Owing to a lack of official trade data published by Mongolia, this table should not be taken as a complete presentation of this country's mineral trade. Unless otherwise specified, these data have been compiled from United Nations information and data published by the partner trade countries.

²Statistical yearbook of Members of the Council for Mutual Economic Assistance, Moscow, U.S.S.R.

Table 10.—Mongolia: Apparent imports of mineral commodities¹

(Metric tons unless otherwise specified)

Commodity	1979	1980 ^P	Sources, 1980	
			United States	Other (principal)
METALS				
Iron and steel metal: ²				
Pig iron, cast iron, powder, shot....	2,400	2,100	--	NA.
Semimanufactures:				
Tubes and pipes.....	10,400	8,600	--	NA.
Other.....	39,600	38,400	--	NA.
NONMETALS				
Cement.....	² 47,300	² 36,400	--	All from U.S.S.R.
Clay products, nonrefractory.....	1,164	248	--	All from Italy.
Fertilizer materials, manufactured:				
Nitrogenous, N content.....	² 24,000	² 13,400	--	U.S.S.R. 7,600; undetermined 5,798.
Phosphatic, P ₂ O ₅ content.....	² 20,200	² 37,200	--	All from U.S.S.R.
Precious and semiprecious stones, natural value, thousands....	--	\$1	--	All from West Germany.
Salt and brine.....	1,458	2,094	--	All from U.S.S.R.
Sodium and potassium compounds:				
Caustic soda ²	500	1,000	--	NA.
Soda ash.....	--	² 100	--	Japan 4; undetermined 96.
Stone, dimension, worked.....	15	18	--	All from Italy.
Sulfuric acid.....	² 1,300	² 1,300	--	U.S.S.R. 910.
MINERAL FUELS AND RELATED MATERIALS				
Coal, anthracite and bituminous ²	1,500	--		
Petroleum and refinery products: ²				
Crude..... 42-gallon barrels....	44,100	--		

See footnotes at end of table.

Table 10.—Mongolia: Apparent imports of mineral commodities¹ —Continued

(Metric tons unless otherwise specified)

Commodity	1979	1980 ^P	Sources, 1980	
			United States	Other (principal)
MINERAL FUELS AND RELATED MATERIALS—Continued				
Petroleum and refinery products: ² — Continued				
Refinery products:				
Lubricants				
42-gallon barrels...	151,900	159,600	--	NA.
Other				
thousand 42-gallon barrels...	4,066	4,428	--	NA.
Mineral tar and other coal-, petroleum-, and gas-derived crude chemicals	1,080	608	--	All from U.S.S.R.

^PPreliminary. NA Not available.¹Owing to a lack of official trade data published by Mongolia, this table should not be taken as a complete presentation of this country's mineral trade. Unless otherwise specified, these data have been compiled from United Nations information and data published by the partner trade countries.²Statistical yearbook of Members of the Council for Mutual Economic Assistance, Moscow, U.S.S.R.

NEPAL³¹

The mineral industry of Nepal played virtually no part in the country's economy in 1981, employing a total of only 1,200 persons. Nepal's entire industrial sector employed only about 1% of the labor force and contributed about 5% of the GDP. Most industry was oriented to the agricultural sector. The country was highly agricultural in nature and over 90% of the population was dependent on subsistence farming for its survival. Population density on the arable land was very high.

The insignificant mineral production was a reflection of the primitive state of the country's mineral development. There has been very little detailed geological exploration done in the country. However, it has a high potential for both metallic and nonmetallic mineral deposits.

High-grade copper veins have been mined since ancient times by primitive methods. Some of these mines were still worked by individuals or families and produced up to 1 ton of crudely smelted copper each year. The output went to make domestic brass utensils.

The most likely minerals for development in the near term were magnesite, lead-zinc, limestone for cement, and dimension stone. Petroleum deposits were a possibility. Exploration activity and the exploitation of any discoveries could provide employment for a substantial number of workers in the rural areas. Much of the population was only partly employed because the crowded agricultural conditions did not provide full employment on the farms.

GNP at current prices was estimated at \$2.4 billion³² for FY 1980-81.³³

At constant 1977 prices, the economy

grew about 5.5% in FY 1980-81 compared with the small decline experienced the previous year. The rise in GDP was attributable to the good food grain harvest and a generally good yield in the small cash crop harvest.

Inflation continued to be a serious problem, although moderating petroleum prices and easing of the prices of some other basic commodities dispelled thoughts that the economy was out of control. Even so, the official statistics show an increase in the cost of living of over 18%, which, though probably low, was far more realistic than previous official estimates.³⁴

To increase industry and commerce, the Government turned more toward the private sector for their development. The Government rice-exporting monopoly was abolished, and trade was restored to private entrepreneurs. A new investment policy was put forth in 1981 by the Ministry of Industry, which would accord a range of generous concessions to foreign investors. Implementing legislation was pending in the National Assembly.

Future industrialization will be controlled by availability of power and the need for a ready market for the products turned out. Since the subsistence farmers have virtually no cash income, there was very little purchasing power to support import-substitution industries. Export-oriented industry faced stiff competition with the Indian market.

One bright spot for Nepal was its huge hydroelectric potential, about 80 million kilowatts of power. This amounts to 2.6% of the world total for a country occupying only 0.09% of the world land area.

During the last several years, demand for electric power, though small by any normal criterion, was well ahead of the installed capacity. Shortages have become acute, and load shedding was common during 1980 and 1981.

Work on several projects was underway during the year, and plans were progressing on others. The Government's main priority in 1981 was to complete construction on the 114-meter-high Kulekhani rockfill dam and powerplant. The dam was completed in June, and the reservoir began filling at that time. An underground powerhouse with two 30,000-kilowatt turbogenerators was completed in September, and the 6-kilometer-long headrace tunnel to the powerhouse was completed in October 1981. Power was generated on a trial basis in November. Commercial power was scheduled to be generated in the first quarter of 1982. Completion of the plant will end load-shedding in the Kathmandu-Hetauda area and also allow long needed overhauls to be performed on the major hydroelectric and diesel powerplants of the system. Total cost of the Kulekhani project was \$129 million, mostly financed with foreign aid. A total of 3.5 million workdays of labor were expended on the construction.

The bulk of Nepal's current 68,000 kilowatts of installed generating capacity came from three hydroelectric plants: Trisuli, 21,000 kilowatts; Sunkosi, 10,050 kilowatts; and also the new Gandok, 15,000 kilowatts.

Several other projects have been planned and detailed feasibility studies conducted. The most promising of many was the Marsyangdi project in Tanahu District of Gandaki zone. It was first proposed seriously in 1978. The Federal Republic of Germany completed a feasibility study in 1979, but the plan was delayed until 1981 when the Government decided to go ahead with the design and survey work. Preliminary site preparation work was expected to be started early in 1982. The original capacity was set at 30,000 kilowatts but was later increased to 66,000 kilowatts. Plans called for completion in 1986.

A number of hydroelectric miniplants were being installed in the outlying districts, beyond the planned coverage of the main electric power distribution lines. The plants were engineered for the local stream conditions and range in capacity from a few tens to a few thousand kilowatts. The immediate intention was to furnish power for pumped irrigation wells. Another impor-

tant purpose was to furnish an alternate domestic source of energy to the nearly universal practice of burning locally cut firewood. In the last few decades, the depletion of the forest cover on hilly terrain has led to serious runoff and soil erosion problems.

Site clearing work got underway on an Indian-aided 14,100-kilowatt hydroelectric plant at Devghat. The Prime Minister laid the cornerstone to the powerhouse in February 1981, and excavation for the headrace tunnels was underway at yearend.

At a more ambitious level, talks were proceeding favorably between India and Nepal on two major hydroelectric power projects—Pancheshwar and Karnali. These multimillion-kilowatt plants have been planned for many years, but progress in arranging for financing, construction, and control of the \$1 billion projects has been slow. These plants would not only open up prospects for industrialization of Nepal but also help to tide it over the adverse balance of trade with India by exporting scores of millions of dollars worth of excess power at mutually agreed rates.

COMMODITY REVIEW

Cement.—There was a shortage of cement in Nepal again during 1981. Local production met only 15% to 20% of the domestic demand. The Himal cement plant was the only operating facility and had a capacity to produce about 160 tons per day. In recent years, the actual production has been nowhere near the rated capacity.

The Himal plant received about a \$3 million loan from the Government of the Federal Republic of Germany to renovate the equipment and expand the daily capacity to 400 tons by 1984.

A modern 750-ton-per-day dry-process rotary-kiln cement plant has been under construction at Hetauda since mid-1978. It was originally scheduled for completion in 1981, but construction has been very slow and cost overruns very large. Completion of the plant was tentatively rescheduled for mid-1984.

Limestone will be supplied by a quarry at Bhaines in Makwanpur District. The stone will be transported via an aerial tramway to the plant.

In September 1978, India and Nepal agreed to set up a joint-venture company to construct a 1,500-ton-per-day cement plant at Udaypur in southeast Nepal. Plans for the project have progressed unusually slow-

ly. Feasibility studies were completed during 1979, and the findings were being studied during 1980. Construction had not begun at yearend 1981.

Magnesite.—Development work continued on the magnesite mining project. Nepal Orind Magnesite Private Ltd. (50% Nepal Government, 50% Orissa Industries Ltd. of India) was formed to exploit the large, high-grade magnesite deposit at Khari Dhunga 87 kilometers northeast of Kathmandu. Manual mining was underway during 1981, and preparations for large-scale blasting and mechanization were being carried out. Crude ore requires beneficiation by flotation to lower the silica content below 0.3%. Output of the mine will be carried via aerial tramway to Lamo Sangu where a 50,000-ton-per-year dead-burnt magnesite plant was probably already under construction. A planned 20,000-ton-per-year refractory products plant at Birganj had not been started at yearend.

Petroleum and Natural Gas.—Nepal was completely dependent on imports of refined products for its petroleum needs. Funding for petroleum exploration has been included in the Government's 5-year plans, but results have been uncertain or inconclusive until recently. In 1979 and 1980, preliminary aeromagnetic surveys were conducted

by French technicians for the Nepal Department of Mines and Geology. The survey indicated the possibility of petroleum deposits in Karnali, Dhaulagiri and Gandaki zones in the hilly western regions.

As a followup in 1981, the Government was reportedly preparing to have a reconnaissance seismic survey conducted in the favorable areas. Should the surveys prove encouraging, exploration drilling would be considered for the 1984-85 period.

Japanese experts have investigated the occurrence of natural gas seeps in water wells in the Kathmandu Valley. About 1,500 million cubic feet of gas was reported in a 4-square-kilometer area at a very shallow depth—300 to 600 meters. A test hole was drilled and was yielding 6,600 cubic feet of gas per day. Tender notices for two additional wells were offered by the Department of Mines and Geology in 1981 but no qualified offers were received. A re-tender notice was published in November.

The projected flow of 21,000 cubic feet per day would meet the fuel requirements of 1,000 to 1,200 households. Even this small amount would be economically significant to the valley where the high cost of petroleum limits its use to a relatively small portion of the population.

SINGAPORE³⁵

Singapore remained the most impressive country in economic performance in 1981 among the five members of ASEAN. Singapore's GDP, at 1968 factor cost, grew 9.9% in 1981 compared with 10.2% in 1980. The slower growth in 1981 was caused primarily by the reduced demand for Singapore's exports from overseas, especially from the European Economic Community. In 1981, trade, manufacturing, transport and communication, and finance and business services remained the dominant industries in the Singapore economy. Despite the continuing improvements in productivity, the country's inflation rates remained at the 8% to 8.5% level in 1980-81.

Singapore's mining industry was comprised of a small quarrying sector, several small mineral processing sectors, a very large mineral fuel refining sector, and a rapidly growing offshore oil exploration supporting sector. The activities of petroleum refining alone not only dominated the activities of the mineral industry, but also contributed substantially to the country's economy.

The activity of the quarrying sector was limited to the production of broken granite. In 1981, granite production increased sharply, reflecting strong demand for the product by the domestic construction industry. In 1981, the quarrying activity in Singapore involved 20 firms employing less than 900 workers. Its value added, estimated at \$58 million,³⁶ accounted for 1.2% of Singapore's total value added of industrial production, which was estimated at \$4.7 billion in 1981.

In Singapore, mineral processing included production of steel, nonferrous metals, and nonmetallic mineral products. In 1981, there were 17 firms engaged in ironmaking and steelmaking activities with about 1,900 workers. The value added by the iron and steel sector was estimated at \$63.1 million and accounted for 1.3% of the total industrial production. The nonferrous metals sector with 12 firms employed about 390 workers. Its value, estimated at \$7.8 million, accounted for less than 0.2% of the total industrial production. Nonmetallic mineral production was by 29 firms employing 1,300 work-

ers. Its value, estimated at \$28.2 million, accounted for 0.6% of total industrial production.

Singapore's petroleum refining sector is the second largest after electronic products manufacturing, in terms of the value added of industrial production. The sector employed about 3,500 workers. Its value added in 1981, estimated at \$841.1 million, accounted for 18% of the total industrial production. Petroleum refining in Singapore was by five refineries with a combined total capacity of 1.1 million barrels per day, which makes Singapore the third largest refining center in the world.

Singapore is the world's second largest offshore drilling rig builder, following the United States. There were five rig building yards operated in 1981. The total revenue from rig building in Singapore was estimated at about \$160 million in 1981. During the 1979-80 period, of the total rig orders placed in the world, Singapore won one in every four orders. Singapore is also the leading oil tanker and rig repair and maintenance center in East Asia. In 1980, the total estimated earnings of the five repair yards in Singapore was \$440 million, of which about 50% was from repair of oil tankers.

In 1981, Singapore's total export earnings were valued at \$21 billion, 8.3% above that of 1980. Total imports were valued at \$27.6 billion in 1981, an increase of 15% from that of 1980. As a result, the merchandise trade deficit increased to \$6.6 billion in 1981 from \$4.6 billion in 1980. The higher trade deficit in 1981 was due mainly to a 37.6% increase in imports of mineral fuels. Imports of mineral fuels valued at \$9.4 billion accounted for 34% of Singapore's total imports, while imports of machinery and transport equipment, valued at \$7.8 billion, accounted for 28.3%. Exports of mineral fuels, valued at \$6.7 billion, accounted for 32% of Singapore's export earnings, while exports of machinery and transport equipment, valued at \$5.6 billion, accounted for 26.6%. In 1981, based on the value of two-way trade, the major trading partners of Singapore were Japan, Malaysia, the United States, Hong Kong, the United Kingdom, and the Federal Republic of Germany.

COMMODITY REVIEW

Metals.—Iron and Steel.—Singapore's crude steel production was mainly by the National Iron and Steel Mills Ltd. (NISM).

Its steelmaking plant at Jurong has five electric arc furnaces. The annual crude steel output capacity was about 380,000 tons. During 1981, the plant was operating near full capacity, and its output of crude steel reached 350,000 tons. The steel products by the company (bars, plate, and angles) were sold mainly to the construction industry. To meet the growing demand for the steel products from the construction industry, the company was ordering a new bar and rod mill from Danieli and Co., an Italian plant designer and builder. NISM was also undertaking a revamp of its melting works by turning the three 40- to 50-ton electromelt furnaces into an ultrahigh power unit and adding water-cooled panels and oxygen burners. As a result, the company's raw steel output capacity is expected to increase to about 550,000 tons per year by mid-1983.³⁷

Nonmetals.—Cement.—Cement production in Singapore is basically a grinding operation using imported clinker. Combined total annual capacity of the five cement companies was 2.75 million tons at the end of 1980. During the 1980-81 period, the total annual output of cement in Singapore remained at the 1.8-million-ton-per-year level. Annual cement capacity by company and plant location was summarized as follows, in thousand tons:

Company	Location	Capacity at end of 1980
Asia Cement (Singapore) Pte., Ltd.	Jurong ---	450
Jurong Cement Ltd	---do---	600
Pan Malaysia Cement Work (Singapore) Pte., Ltd.	---do---	600
Singapore Cement Manufacturing Co.	PSA Gate 1	500
Seangyong Cement Pte., Ltd	Jurong ---	600
Total -----		2,750

The five cement companies employed a total of 450 workers, and the value added in 1981 was estimated at \$31 million.

Mineral Fuels.—Petroleum.—In 1980, Singapore became the world's third largest refining center and the world's second largest offshore rig building country. Most of Singapore's refineries are located on several small islands near Singapore's main island. In 1981, refining capacity by company and location was as follows, in barrels per day:

Company	Location	1981 capacity
Shell Eastern Petroleum Pte., Ltd.	Pulau Bukon ---	460,000
Singapore's Mobil Oil Pte., Ltd.	Singapore, Main Island.	200,000
Esso Singapore Pte., Ltd.	Pulau Ayer Chawan.	195,000
Singapore Refining Co. Pte., Ltd.	Pulau Merlimau -	170,000
Singapore's BP Refinery Pte., Ltd.	Singapore, Main Island.	27,000
Total -----	-----	1,052,000

The startup of a \$150 million hydrocracker project of Shell Eastern Petroleum Pte., Ltd., to produce middle distillates at a 30,000-barrel-per-day capacity was postponed to the end of 1983, and the total cost of the project was revised to \$280 million in 1981. Singapore Refining Co. Pte., Ltd., 40% owned by Singapore Petroleum Co. Pte., Ltd., 30% by Caltex Oil Corp. of the United States, and 30% by British Petroleum Corp., was planning to build a \$65 million catalytic reformer unit to produce 12,000 barrels per day of gasoline. The unit was expected to come onstream by the end of 1982. In 1980, Esso Singapore Pte., Ltd., began a \$150 million expansion and renovation program, which includes expansion of the lubricating oil plant, a product wharf handling vessels, a crude desalter, and a sulfur recovery plant. The program was expected to be completed in 1982. The \$100 million visbreaker project of Singapore's Mobil Oil

Pte., Ltd., was completed in 1981. The 50,000-barrel-per-day visbreaker was built by Chiyoda Chemical Engineering and Construction Co.⁵⁸

In 1981, Compagnie Française de Petrol, a French company, joined Singapore's oil drilling and exploration supporting industry. Singapore's manufacture of oilfield equipment supply and drilling operation supporting activities were mainly by the U.S. firms Vetco Singapore Pte. Ltd., Hughes Tool Singapore Pte. Ltd., FMC Corp., Cameron Iron Works Singapore Pte. Ltd., Tri-State Oil Tool Singapore Pte. Ltd., Baker Oil (Far East) Pte. Ltd., Smith International Inc., and Hydnil Co. In oil rig construction, Bethlehem Singapore Pte. Ltd. and Marathon Letourneau Offshore Pte. Ltd. of the United States, Robin Shipyard Pte. Ltd. (Singapore-United States joint-venture company), and Far East-Lexington Shipbuilding Pte. Ltd. and Promet Pte. Ltd. of Singapore dominated the business activities. Repair and maintenance activities of oil tankers and oil rigs were by five repair yards. The Government of Singapore has a stake in four of the five repair yards. Sembawang Shipyard Pte. Ltd., Jurong Shipyard Pte. Ltd., Keppel Shipyard Pte. Ltd., and Mitsubishi Singapore Heavy Industries Pte. Ltd. are Singapore firms, while Hitachi Zosen Robin Dockyard Pte. Ltd. is a Singapore-Japanese private joint-venture company.

Table 11.—Singapore: Exports and reexports of mineral commodities
(Metric tons unless otherwise specified)

Commodity	1979	1980	Destinations, 1980	
			United States	Other (principal)
METALS				
Aluminum:				
Oxides and hydroxides -----	882	1,789	--	Malaysia 1,764.
Metal including alloys:				
Scrap -----	22,517	6,438	4	Japan 3,560; Pakistan 1,143; Taiwan 875.
Unwrought and semimanufactures -----	7,083	8,371	(¹)	Malaysia 5,383; Hong Kong 1,125.
Ore and concentrate -----	--	6	NA	NA.
Antimony metal including alloys, all forms -----	80	36	--	Malaysia 18; India 15.
Bismuth metal including alloys, all forms -----	--	11	NA	NA.
Cadmium metal including alloys, all forms -----	113	1,000	NA	NA.
Chromium:				
Oxides and hydroxides -----	34	34	--	All to Malaysia.
Metal including alloys, all forms -----	250	120	NA	NA.
Cobalt:				
Oxides and hydroxides -----	24	1	--	All to Malaysia.
Metal including alloys, unwrought -----	2	7	--	North Korea 3; Taiwan 3.

See footnotes at end of table.

Table 11.—Singapore: Exports and reexports of mineral commodities —Continued
(Metric tons unless otherwise specified)

Commodity	1979	1980	Destinations, 1980	
			United States	Other (principal)
METALS—Continued				
Copper:				
Ore and concentrate	—	1	—	All to Republic of Korea.
Matte	5	—	—	
Metal including alloys:				
Scrap	15,543	13,865	—	India 9,975; Japan 2,273; Taiwan 1,166.
Unwrought and semimanufactures	6,353	6,733	—	Malaysia 6,043.
Iron and steel:				
Ore and concentrate value	\$540	—	—	
Metal:				
Scrap	1,710	5,475	—	Hong Kong 2,050; Japan 1,364.
Pig iron, ferroalloys, similar materials	12,046	9,951	—	Malaysia 9,554.
Steel, primary forms	6,915	6,784	—	Malaysia 6,177.
Semimanufactures:				
Bars, rods, angles, shapes, sections	122,262	132,912	—	Malaysia 92,469; Hong Kong 11,268.
Universals, plates, sheets	111,598	120,490	—	Malaysia 99,231.
Hoop and strip	4,724	2,463	—	Malaysia 2,029.
Rails and accessories	9,285	6,621	—	Malaysia 6,574.
Wire	4,961	5,666	—	Malaysia 4,209; Brunei 908.
Tubes, pipes, fittings	63,059	98,066	—	Malaysia 18,714; Brunei 11,394; Thailand 10,726.
Castings and forgings, rough	412	651	98	Tunisia 212; Malaysia 184.
Lead:				
Ore and concentrate	62	123	—	West Germany 114.
Oxides and hydroxides	398	479	—	Malaysia 469.
Metal including alloys:				
Scrap	3,311	2,256	—	Taiwan 1,563; Malaysia 389.
Unwrought and semimanufactures	965	2,223	—	Malaysia 853; Thailand 802.
Magnesium metal including alloys, unwrought kilograms	417	4,468	—	Republic of Korea 2,700.
Manganese:				
Ore and concentrate	20,706	32,788	—	India 7,719; Philippines 6,463; Malaysia 2,610.
Oxides and hydroxides	1,172	969	—	Malaysia 567; North Korea 250.
Mercury 76-pound flasks	23	68	—	Mainly to Hong Kong.
Nickel:				
Ore and concentrate	1	5	—	All to Malaysia.
Metal including alloys:				
Scrap	379	561	48	Japan 448.
Unwrought and semimanufactures	334	1,443	—	India 1,334.
Platinum-group metals including alloys, unwrought and partly wrought troy ounces	64	322	—	Australia 96; Malaysia 96.
Silver:				
Waste and sweepings ² value, thousands	\$1,394	\$3,280	\$889	Japan \$1,150; Australia \$743.
Metal including alloys, unwrought and partly wrought thousand troy ounces	93	1,065	11	United Arab Emirates 286; Australia 262; United Kingdom 207.
Tin:				
Ore and concentrate	6,382	5,351	290	U.S.S.R. 1,851; Spain 1,717; Mexico 618.
Oxide and hydroxide kilograms	936	907	—	Malaysia 904.
Metal including alloys:				
Scrap	131	139	2	Taiwan 99; Japan 34.
Unwrought and semimanufactures	11,002	14,830	7,967	U.S.S.R. 2,577; Iran 984; Netherlands 775.
Titanium:				
Ore and concentrate	55	59	NA	NA.
Oxides and hydroxides	630	542	—	Malaysia 541.
Metal including alloys, all forms kilograms	280	14	NA	NA.
Tungsten:				
Ore and concentrate	397	849	—	North Korea 270; Netherlands 270; India 110.
Metal including alloys, all forms	85	119	50	North Korea 40.

See footnotes at end of table.

Table 11.—Singapore: Exports and reexports of mineral commodities—Continued

(Metric tons unless otherwise specified)

Commodity	1979	1980	Destinations, 1980	
			United States	Other (principal)
METALS—Continued				
Zinc:				
Ore and concentrate value	\$616	\$2,335	--	All to Malaysia.
Oxides and peroxides excluding hydroxides	1,306	1,602	--	Japan 1,066.
Metal including alloys:				
Scrap	1,018	1,281	--	Taiwan 660; Japan 295.
Unwrought and semifinished forms	3,149	5,031	--	Malaysia 3,636; Netherlands 817.
Other:				
Ash and residue containing non-ferrous metals	12,111	31,761	275	Malaysia 12,504; Brunei 10,074.
Oxides, hydroxides, peroxides	93	128	--	Malaysia 63; North Korea 12.
Metals:				
Metalloids	29	9	--	Malaysia 4; Taiwan 3.
Alkali, alkaline-earth, rare-earth metals kilograms	378	14,015	--	Mainly to Malaysia.
Pyrophoric alloys	3	6	--	Thailand 4.
Base metals including alloys, all forms	(¹)	10	--	All to Republic of Korea.
NONMETALS				
Abrasives, n.e.s.:				
Natural: Pumice, emery, corundum, etc	111	60	--	Malaysia 29; India 11.
Artificial: Corundum kilograms	470	136	--	All to Hong Kong.
Dust and powder of precious and semiprecious stones value	\$11,155	\$11,209	--	Malaysia \$6,000; Japan \$4,000.
Grinding and polishing wheels and stones ²	431	374	--	Malaysia 295.
Asbestos, crude	9,535	10,461	--	Malaysia 10,407.
Boron materials:				
Crude natural borates	275	657	--	All to Malaysia.
Oxides and acids	85	204	NA	Malaysia 64; Brunei 20.
Cement	431,989	466,982	--	Malaysia 338,714; Sri Lanka 54,488.
Chalk	1,312	2,104	--	Brunei 1,811.
Clays and clay products:				
Crude:				
Bentonite	21,600	25,596	--	Philippines 6,972; Brunei 6,028; Thailand 3,395.
Fuller's earth	5,066	9,335	--	Malaysia 9,319.
Kaolin (china clay)	1,613	1,941	--	Malaysia 1,784.
Other	4,641	1,674	--	Malaysia 1,162.
Products:				
Nonrefractory ⁴	13,873	18,815	--	Malaysia 16,196.
Refractory including nonclay brick ⁵	466	609	--	Malaysia 551.
Diamond:				
Gem, not set or strung value, thousands	\$6,322	\$5,429	--	Hong Kong \$1,866; Belgium-Luxembourg \$1,079; Israel \$1,072.
Industrial do	\$345	\$520	--	Saudi Arabia \$138; Israel \$136; Belgium-Luxembourg \$112.
Diatomite and other infusorial earth	60	91	--	Malaysia 70; Philippines 19.
Feldspar and fluorspar	4,941	5,850	--	All to Malaysia.
Fertilizer materials:				
Crude:				
Nitrogenous	1	8	--	Malaysia 6; Sri Lanka 2.
Phosphatic	12,465	18,653	--	Malaysia 14,924; Taiwan 3,302.
Manufactured:				
Nitrogenous	36,701	61,916	--	Malaysia 44,035; Bangladesh 8,836.
Phosphatic	28,946	73,526	--	Bangladesh 30,426; China 20,300.
Potassic	234,167	188,654	--	Malaysia 136,676; Bangladesh 34,177.
Other including mixed	122,860	102,547	--	Malaysia 102,028.
Ammonia	381	377	--	Malaysia 290.
Graphite, natural	75	126	--	Malaysia 122.
Gypsum and plasters	1,405	1,251	--	Malaysia 952.
Lime	5,574	6,457	--	Malaysia 3,178; Sri Lanka 1,998.
Magnesite	102	337	--	Malaysia 256.
Mica, all forms	153	274	--	Malaysia 179; Brunei 40.
Pigments, mineral:				
Natural, crude	200	49	NA	NA.
Iron oxides, processed	427	449	--	Malaysia 424.
Precious and semiprecious stones, natural and synthetic, excluding diamond value, thousands	\$26,390	\$27,847	\$173	Hong Kong \$25,706.
Salt and brine value, thousands	14,131	13,695	--	Malaysia 12,699.

See footnotes at end of table.

Table 11.—Singapore: Exports and reexports of mineral commodities—Continued

(Metric tons unless otherwise specified)

Commodity	1979	1980	Destinations, 1980	
			United States	Other (principal)
NONMETALS—Continued				
Sodium and potassium compounds, n.e.s.:				
Caustic potash -----	258	249	--	Malaysia 149; United Arab Emirates 30.
Caustic soda -----	10,893	3,509	--	Malaysia 1,963; Bangladesh 590.
Soda ash -----	5,939	13,139	--	Malaysia 9,424; Bangladesh 3,561.
Stone, sand and gravel:				
Dimension stone:				
Crude and partly worked -----	426	191	--	Malaysia 116.
Worked ^a -----	1,726	710	--	Malaysia 406; Brunei 76.
Dolomite, chiefly refractory-grade -----	2,494	40	--	Papua New Guinea 30.
Gravel and crushed rock -----	4,315	2,985	--	Malaysia 2,383.
Limestone except dimension -----	666	627	--	Malaysia 515.
Quartz and quartzite ----- kilograms -----	3,484	183	NA	NA.
Sand excluding metal-bearing -----	1,355	583	--	Australia 91; Philippines 91; Malaysia 50.
Sulfur:				
Elemental:				
Other than colloidal -----	5,190	3,130	--	North Korea 1,972; Malaysia 1,141.
Colloidal, sublimed and precipitated -----	16,068	17,451	--	Malaysia 14,170; North Korea 2,420.
Dioxide ----- kilograms -----	420	292	NA	NA.
Sulfuric acid -----	804	782	NA	Sri Lanka 357; Malaysia 323.
Talc, steatite, soapstone, pyrophyllite -----	807	554	--	Malaysia 497.
Other:				
Crude -----	64,165	49,207	--	Malaysia 44,505.
Slag, dross, similar waste, not metal-bearing -----	13,858	13,247	--	Japan 11,400.
Oxides and hydroxides of magnesium, strontium, barium -----	14	11	--	Malaysia 10.
Bromine, iodine, fluorine ----- value -----	\$12,812	\$16,813	--	Brunei \$7,000; Malaysia \$7,000; Burma \$2,000.
Building materials of asphalt, asbestos and fiber cements, unfired nonmetals -----	17,973	17,174	--	Malaysia 7,355; Sri Lanka 6,782.
MINERAL FUELS AND RELATED MATERIALS				
Asphalt and bitumen, natural -----	26,478	7,656	--	Malaysia 4,185; Burma 1,730.
Carbon black -----	690	687	--	Malaysia 436; Thailand 221.
Coal, all grades including briquets -----	1,038	1,588	--	Malaysia 991; Thailand 272.
Coke and semicoke -----	8,242	8,486	--	Malaysia 8,233.
Hydrogen, helium, rare gases ----- value, thousands -----	\$1,161	\$1,498	--	Malaysia \$461; Brunei \$404; India \$181.
Petroleum:				
Crude and partly refined ----- thousand 42-gallon barrels -----	907	552	--	Malaysia 549.
Refinery products:				
Gasoline:				
Aviation ----- do -----	390	511	--	Australia 133; New Caledonia 95; New Guinea 86.
Motor ----- do -----	13,561	13,748	--	Malaysia 4,307; Thailand 1,889 New Zealand 1,564.
Jet fuel ----- do -----	17,119	15,606	1,623	Japan 3,771; Hong Kong 2,387; New Zealand 1,747.
Kerosine and white spirits ----- do -----	6,829	7,499	--	Hong Kong 2,192; Malaysia 1,435; India 1,410.
Distillate fuel oil ----- do -----	30,435	33,282	--	Malaysia 8,229; Thailand 5,394; India 4,294.
Residual fuel oil ----- do -----	56,929	62,108	1,827	Hong Kong 24,076; Japan 11,529; Australia 6,805.
Lubricants ----- do -----	3,791	3,532	--	Thailand 830; Malaysia 804; Saudi Arabia 330.
Mineral jelly and wax ----- do -----	345	263	--	Japan 54; Malaysia 25; Thailand 24.

See footnotes at end of table.

Table 11.—Singapore: Exports and reexports of mineral commodities —Continued

(Metric tons unless otherwise specified)

Commodity	1979	1980	Destinations, 1980	
			United States	Other (principal)
MINERAL FUELS AND RELATED MATERIALS —Continued				
Petroleum —Continued				
Refinery products —Continued				
Other:				
Naphtha				
thousand 42-gallon barrels				
	18,779	19,167	804	Japan 12,108; New Zealand 2,577; Taiwan 1,281.
Nonlubricating oils do	580	472	--	Sweden 239; Thailand 110; Malaysia 72.
Petroleum coke do	84	21	--	Malaysia 8; Brunei 7; Oman 6.
Liquefied petroleum gas do	1,024	1,699	--	Hong Kong 586; Thailand 494; Malaysia 462.
Bitumen and bituminous mixtures, n.e.s. do	1,423	1,192	--	Australia 261; Malaysia 217; Bangladesh 128.
Unspecified do	6,531	978	--	Japan 357; Philippines 328; Malaysia 103.
Mineral tar and other coal-, petroleum-, and gas-derived crude chemicals	4,426	4,439	--	Taiwan 2,555; Kampuchea 1,000.

¹Revised. NA Not available.²Less than 1/2 unit.³May include platinum-group metals.⁴Excludes quantity valued at \$14,565 in 1979 and \$1,863 in 1980.⁵Excludes quantity of ceramic building bricks valued at \$60,488 in 1979 and \$75,191 in 1980.⁶Excludes quantity of refractory bricks valued at \$32,093 in 1979 and \$299,365 in 1980.⁷Excludes quantity valued at \$115 in 1979 and \$467 in 1980.

Table 12.—Singapore: Imports of mineral commodities

(Metric tons unless otherwise specified)

Commodity	1979	1980	Sources, 1980	
			United States	Other (principal)
METALS				
Aluminum:				
Ore and concentrate	11,000	400	--	All from China.
Oxides and hydroxides	7,583	8,185	216	China 5,666; Japan 2,117.
Metal including alloys:				
Scrap	334	433	--	Malaysia 342; Brunei 78.
Unwrought and semimanufactures	28,739	29,567	4,406	Australia 3,990; Japan 3,725; Malaysia 3,109; Sweden 2,106
Antimony metal including alloys, all forms	14	51	--	China 50.
Arsenic: Natural sulfides	2	10	NA	NA.
Beryllium metal including alloys, all forms	26	20	NA	NA.
Bismuth metal including alloys				
unwrought do	2,310	45	NA	NA.
Cadmium metal including alloys				
unwrought	5	3	--	All from Australia.
Chromium oxides and hydroxides	163	307	78	Japan 86; Netherlands 38; Finland 36.
Cobalt:				
Oxides and hydroxides	25	3	--	Japan 2.
Metal including alloys, unwrought	2	7	--	Netherlands 4; Japan 3.
Columbium and tantalum metals including alloys, all forms	140	34	NA	NA.
Copper:				
Ore and concentrate	1	NA	--	NA.
Matte value	\$40	--	--	--
Metal including alloys:				
Scrap	3,060	5,026	--	Malaysia 4,652.
Unwrought and semimanufactures	23,832	31,716	1,000	Japan 18,000; Australia 5,075; New Zealand 798.

See footnotes at end of table.

Table 12.—Singapore: Imports of mineral commodities —Continued

(Metric tons unless otherwise specified)

Commodity	1979	1980	Sources, 1980	
			United States	Other (principal)
METALS—Continued				
Indium metal including alloys				
unwrought ----- kilograms	20,027	20	--	All from United Kingdom.
Iron and steel:				
Ore and concentrate -----	6,781	9,605	--	Malaysia 9,590.
Metal:				
Scrap -----	109,055	172,028	47,231	Australia 114,419.
Pig iron including cast iron -----	79,862	31,490	16,532	China 6,887; Australia 6,492.
Sponge iron, powder, shot -----	1,266	1,694	1,065	Japan 206.
Ferroalloys:				
Ferromanganese -----	6,328	3,534	--	Australia 3,154.
Other -----	1,409	4,878	50	Australia 3,236; Taiwan 598.
Steel, primary forms -----	110,990	96,377	43	Spain 30,735; Australia 20,351; Japan 15,203.
Semimanufactures:				
Bars, rods, angles, shapes, sections -----	246,862	444,187	4,530	Japan 252,784; West Germany 35,150; Mozambique 31,110.
Universals, plates, sheets -----	611,132	656,724	5,218	Japan 473,828; Republic of Korea 84,009.
Hoop and strip -----	30,545	24,991	842	Japan 18,227; Republic of Korea 2,661; West Germany 1,323.
Rails and accessories -----	34,010	25,651	32	Poland 14,891; Japan 7,906.
Wire -----	18,122	18,858	137	Japan 7,711; China 7,079.
Tubes, pipes, fittings -----	291,030	338,602	14,627	Japan 280,750; Malaysia 7,899; India 6,652.
Castings and forgings, rough	10,246	10,691	3,020	Japan 5,848; Australia 1,401.
Lead:				
Ore and concentrate -----	114	190	--	Thailand 114; Australia 54.
Oxides and hydroxides -----	497	554	--	Australia 429; West Germany 86.
Metal including alloys:				
Scrap -----	235	214	--	Malaysia 80; Brunei 74.
Unwrought -----	4,373	8,095	1	Australia 4,435; Burma 1,861; Malaysia 725.
Semimanufactures -----	911	856	4	Australia 653.
Magnesium metal including alloys, all forms -----	22	15	9	Australia 3.
Manganese:				
Ore and concentrate -----	33,517	60,468	--	NA.
Oxides and hydroxides -----	2,767	3,319	13	Ireland 1,566; China 1,047.
Mercury ----- 76-pound flasks	116	90	34	Japan 28.
Molybdenum metal including alloys, all forms -----	4	3	2	NA.
Nickel metal including alloys:				
Scrap -----	55	237	--	Malaysia 182.
Unwrought and semimanufactures -----	300	1,357	19	France 1,125.
Platinum-group metals including alloys, unwrought and partly wrought				
troy ounces -----	5,466	19,290	675	Australia 3,794; West Germany 2,283.
Silver:				
Ore and concentrate ¹ ----- kilograms	10	434	149	Taiwan 204; United Kingdom 54.
Waste and sweepings ¹ ----- value, thousands	\$138	\$146	--	All from Malaysia.
Metal including alloys, unwrought and partly wrought ----- troy ounces	809,169	741,910	57,068	Australia 208,240; Switzerland 140,113; West Germany 133,297.
Tin:				
Ore and concentrate -----	4,227	3,370	--	Burma 1,496; Thailand 1,404.
Oxides and hydroxides -----	2	6	4	NA.
Metal including alloys:				
Scrap -----	156	1,032	--	Australia 901; Malaysia 75.
Unwrought and semimanufactures -----	2,013	2,782	5	Malaysia 2,100.
Titanium:				
Ore and concentrate -----	1,176	541	--	Malaysia 400; Australia 141.
Oxides and hydroxides -----	4,338	3,768	256	Japan 1,544; West Germany 612; United Kingdom 551.
Metal including alloys, unwrought ----- kilograms	1,423	684	314	Japan 162.
Tungsten:				
Ore and concentrate -----	486	1,346	2	Burma 947; Thailand 222.
Metal including alloys, all forms -----	76	160	19	Republic of Korea 56; Japan 21; Austria 19.

See footnotes at end of table.

Table 12.—Singapore: Imports of mineral commodities —Continued

(Metric tons unless otherwise specified)

Commodity	1979	1980	Sources, 1980	
			United States	Other (principal)
METALS —Continued				
Zinc:				
Ore and concentrate	10	139	--	Burma 71; Australia 51.
Oxides and peroxides excluding hydroxides	397	531	18	United Kingdom 101; Canada 100; China 97.
Metal including alloys:				
Scrap	445	351	--	Malaysia 244; Canada 49.
Unwrought and wrought	18,038	18,482	303	Canada 8,490; Australia 4,246; China 1,362.
Zirconium ore and concentrate	377	1,102	--	Australia 1,021.
Other:				
Ash and residue containing non-ferrous metals	104,240	114,052	--	Japan 100,935; Malaysia 12,501.
Oxides, hydroxides, peroxides	670	754	32	China 247; Norway 161; West Germany 94.
Metals:				
Metalloids	26	92	(?)	Japan 71; India 18.
Alkali, alkaline-earth, rare-earth metals	64	134	13	Japan 59; France 52.
Pyrophoric alloys	81	110	--	China 93; Hong Kong 10.
Base metals including alloys, all forms	8	13	--	United Kingdom 5.
NONMETALS				
Abrasives, n.e.s.:				
Natural: Pumice, emery, corundum, etc	293	298	114	India 54; Australia 51; Japan 29.
Artificial: Corundum kilograms	--	68	NA	NA.
Dust and powder of precious and semi-precious stones value	\$406,358	\$3,874	\$374	West Germany \$8,000.
Grinding and polishing wheels and stones	1,456	2,062	62	Japan 731; China 514; Italy 248.
Asbestos, crude	12,008	16,661	1,748	Australia 6,198.
Barite and witherite	50,774	66,343	--	Thailand 64,574.
Boron materials:				
Crude natural borates	628	748	748	NA.
Oxides and acids	602	175	155	Japan 1,232; Republic of Korea 377.
Cement thousand tons	1,682	1,831	(?)	Malaysia 6,242; United Kingdom 1,584.
Chalk	3,741	8,854	--	
Clays and clay products:				
Crude:				
Bentonite	46,377	46,778	46,288	China 250.
Fuller's earth	3,187	4,856	424	West Germany 3,870.
Kaolin (china clay)	5,983	5,286	20	Malaysia 2,861; Japan 1,423; United Kingdom 832.
Other	18,307	13,753	560	Malaysia 7,662; Japan 2,807; China 1,141.
Products:				
Nonrefractory ⁴	76,866	96,682	27	Italy 46,333; Japan 12,257; Spain 6,366.
Refractory including nonclay brick ⁵	7,067	13,181	487	United Kingdom 5,899; Australia 3,186.
Diamond:				
Gem, not set or strung value, thousands	\$36,043	\$69,415	\$1,914	Israel \$24,285; Belgium-Luxembourg \$19,082; India \$14,706.
Industrial do	\$2,015	\$4,579	--	Israel \$2,027; Belgium-Luxembourg \$1,602.
Diatomite and other infusorial earth	657	619	356	China 130; Philippines 69.
Feldspar and fluorspar	5,829	8,312	--	India 6,972.
Fertilizer materials:				
Crude, phosphatic	17,090	20,393	--	Christmas Island 18,208; India 683.
Manufactured:				
Nitrogenous	67,219	52,169	13	U.S.S.R. 16,629; Italy 9,000; Republic of Korea 7,253.
Phosphatic	53,217	36,977	36,157	Israel 360.
Potassic	297,644	307,627	--	Canada 126,290; West Germany 51,682; Israel 46,459.
Other including mixed	119,008	139,747	21,171	West Germany 75,575; Belgium-Luxembourg 25,589.
Ammonia	542	437	114	Malaysia 134; Netherlands 48; West Germany 44.
Graphite, natural	519	572	102	China 271; Republic of Korea 140.

See footnotes at end of table.

Table 12.—Singapore: Imports of mineral commodities —Continued

(Metric tons unless otherwise specified)

Commodity	1979	1980	Sources, 1980	
			United States	Other (principal)
NONMETALS—Continued				
Gypsum and plasters	75,268	76,910	--	Australia 49,511; Japan 25,380.
Kyanite and sillimanite value	\$145	--	--	
Lime	14,373	16,453	234	Malaysia 12,787; China 2,569.
Magnesite	288	638	21	China 368; Norway 116; West Germany 68.
Mica, all forms	309	1,455	401	India 542; China 370.
Pigments, mineral:				
Natural, crude	33	--	--	
Iron oxides, processed	2,266	2,422	207	West Germany 752; Japan 689; China 578.
Precious and semiprecious stones, except diamond, worked and unworked:				
Natural value, thousands	\$26,971	\$26,775	\$442	Kenya \$17,441; Sri Lanka \$1,947. Thailand \$80; Austria \$79.
Manufactured do	\$105	\$217	--	Thailand 31,779; Australia 6,647; Israel 3,306.
Salt and brine	47,139	48,064	1,515	
Sodium and potassium compounds, n.e.s.:				
Cautic potash and sodic and potassic peroxides	592	482	36	Hong Kong 172; Spain 104; Japan 71.
Cautic soda	30,103	30,392	14,401	East Germany 6,015; Switzerland 2,964; Romania 2,296.
Soda ash	23,148	28,675	2,000	Kenya 18,098; Romania 6,450; Japan 1,161.
Stone, sand and gravel:				
Dimension stone:				
Crude and partly worked	17,121	3,099	--	Malaysia 1,482; Pakistan 589; Italy 512.
Worked	11,406	15,972	6	Italy 6,710; China 4,124.
Dolomite, chiefly refractory-grade	5,137	2,348	--	Malaysia 2,251.
Gravel and crushed rock	1,086,940	62,240	10	Malaysia 56,106.
Limestone excluding dimension	49,160	69,712	--	Malaysia 46,500; Japan 21,564.
Quartz and quartzite	948	635	4	China 580; United Kingdom 27.
Sand excluding metal-bearing	281,142	58,975	3,796	Malaysia 54,162.
Sulfur:				
Elemental:				
Other than colloidal	568	245	--	Taiwan 62; Canada 50.
Colloidal	168	596	145	Republic of Korea 323; Poland 115.
Dioxide	1	4	NA	NA.
Sulfuric acid	846	322	35	Malaysia 185; West Germany 54.
Talc, steatite, soapstone, pyrophyllite	4,885	5,143	177	China 3,607; Republic of Korea 894.
Other:				
Crude	101,436	5,288	--	West Germany 4,385; Malaysia 762.
Slag, dross, similar waste, not metal-bearing	9,590	7,746	--	Japan 6,302; United Kingdom 1,072.
Oxides and hydroxides of magnesium, strontium, barium	57	43	--	Japan 41.
Bromine, iodine, fluorine value	\$39,618	\$67,719	\$37,362	West Germany \$14,478.
Building materials of asphalt, asbestos and fiber cements, unfired non-metals	7,615	9,844	8	Thailand 4,201; Malaysia 4,089.
MINERAL FUELS AND RELATED MATERIALS				
Asphalt and bitumen, natural	2,022	1,246	121	Republic of Korea 1,001.
Carbon black	6,293	9,161	289	Malaysia 6,301; Japan 2,041.
Coal, all grades including briquets	1,148	2,298	1,830	Malaysia 258; Canada 105.
Coke and semicoke	9,261	11,778	--	Taiwan 6,050; Japan 5,500.
Hydrogen, helium, rare gases value, thousands	\$530	\$1,111	\$118	Australia \$303; United Kingdom \$282; Japan \$251.
Petroleum:				
Crude and partly refined thousand 42-gallon barrels	207,939	185,431	--	Saudi Arabia 103,735; Kuwait 39,968; Malaysia 19,194.
Refinery products:				
Gasoline:				
Aviation do	377	455	31	Netherlands Antilles 219; Netherlands 116.
Motor do	116	124	--	Australia 84; Philippines 36.
Jet fuel do	49	357	--	China 199; Greece 95.
Kerosine and white spirit do	289	347	(*)	Malaysia 280; China 48.
Distillate fuel oil do	2,147	4,288	173	China 819; Bahrain 742; Australia 479.
Residual fuel oil do	22,621	30,348	2,910	Bahrain 10,489; Iran 7,871; Kenya 2,794.
Lubricants do	707	702	29	Australia 190; Netherlands Antilles 128; Malaysia 101.

See footnotes at end of table.

Table 12.—Singapore: Imports of mineral commodities —Continued

(Metric tons unless otherwise specified)

Commodity	1979	1980	Sources, 1980	
			United States	Other (principal)
MINERAL FUELS AND RELATED MATERIALS —Continued				
Petroleum —Continued				
Refinery products —Continued				
Other:				
Mineral jelly and wax thousand 42-gallon barrels	62	106	1	China 80.
Nonlubricating oils do	58	51	10	Malaysia 12; China 9.
Petroleum coke do	¹ 28	22	16	United Kingdom 3.
Liquefied petroleum gas do	(²)	35	--	Thailand 22; Japan 13.
Bitumen and bituminous mixtures do	23	12	(³)	Thailand 6.
Unspecified do	2,444	1,642	5	Malaysia 1,154.
Mineral tar and other coal-, petroleum-, and gas-derived crude chemicals	⁴ 4,931	6,678	19	Australia 3,398; United Kingdom 1,484.

¹Revised. NA Not available.²May include platinum-group metals.³Less than 1/2 unit.⁴Excludes quantity valued at \$43,656 in 1979 and \$31,291 in 1980.⁵Excludes quantity of bricks and baked clay valued at \$524,865 in 1979 and \$456,753 in 1980.⁶Excludes quantity valued at \$5,984,544 in 1979 and \$8,297,684 in 1980.

SRI LANKA³⁹

Sri Lanka was a major world producer of colored gem stones in 1981 and an important producer of heavy mineral beach sands. The only other minerals of local importance were graphite, mica, feldspar, apatite, limestone, and several of the clays. A copper-iron deposit was reported but not exploited. The mineral industry generally produced about 3% to 4% of the total value of exports; most of the mineral portion was from gems and surplus petroleum refinery products.

The Government that came to power in mid-1977 began a comprehensive program to reform the economy and to accelerate economic growth. It has taken steps to free the economy from excessive controls, to provide industries with increased incentives to produce, and to reduce consumer subsidies. The measures included unification and floating of the exchange rate; removal of exchange controls on imports; liberalization of import licensing; elimination of Government import monopolies; lifting of most price controls; guaranteed prices for certain agricultural commodities; reduction of consumer subsidies including those on rice, sugar, flour, and petroleum products; increased interest rates to promote savings; and encouragement of foreign and domestic investment.

The new fiscal program was initially very successful, but the rate of growth slowly

declined. The real growth in GNP jumped from a range of 1% to 2% in the early 1970's to 8.2% in 1978, 6.3% in 1979, and 5.6% in 1980. The estimated growth had dropped to about 5.0% in 1981. The main problem apparently was that the Government was spending far more than its income, mostly on three big development projects that were turning out to be much more expensive than originally planned. By 1981, the total Government expenditures were running more than twice the total revenue.

Fiscal problems became acute as large amounts of imports were needed for the development projects, but exports, mainly agricultural products, failed to increase at the same rate. The trade deficit increased from \$477 million in 1979 to \$985 million in 1980. In the first 9 months of 1981 the deficit increased a further 10% over the 1980 level.

Various international funds, agencies, and individual countries have been supplying aid to finance the huge deficits and trade imbalances. The world economic situation, however, has made it more difficult to obtain the large aid grants needed to pay for the deficits. Funds that were available did not buy as much as world prices increased and the value of the Sri Lanka rupee dropped over 22% against the dollar and nearly 32% against the Japanese yen, from 1977 through 1981.

By the end of 1980, the Government had begun a series of changes and cutbacks designed to bring the economic situation back under control. Government expenditures were reduced significantly and domestic income was increased by the imposition of higher taxes. Capital expenditures on the huge Mahaweli River diversion project and the urban redevelopment project were scaled down in 1981, and the cutbacks continued in the planned fiscal year 1982 budget.

A possible indication of the effects of the new fiscal restraint was a reduction of the inflation rate from the 31% to 35% level in 1980 to about 18% in 1981.

The 147,000-ton-per-year nitrogen naphtha-based ammonia-urea plant at Sapugaskanda was finally commissioned in March 1981 after several months of trial production. The plant is to produce over 1,000 tons per day of urea for domestic consumption. It was designed and built by Kellogg Overseas Corp. and should relieve the country of the burden of importing all of its nitrogen fertilizer needs.

A large deposit of apatite was discovered in the early 1970's at Eppawala in North Central Province. Proved reserves are 25 million tons of ore grading between 34% and 38% P_2O_5 . Although the ore is high in phosphorus content, its solubility is very low and it contains high levels of impurities, especially chloride. Normal methods of calcination and scrubbing do not produce a product suitable for making phosphoric acid. The search for a suitable process for economically removing the highly corrosive chloride continued during the year. A small grinding plant currently operates at the Eppawala deposit. The untreated ground apatite was used for direct crop application where farming conditions would tolerate the impurities. Only a few thousand tons was used in this manner each year.

Except for diamond, emerald, and opal, nearly all the other varieties of gem stones have been produced in Sri Lanka since ancient times. All mining is in riverbed gravels or former channels now covered by recent alluvium. The traditional mining method was for one or two workers to dig a pit in a likely looking deposit and manually pan for gem stones.

Major changes took place in the industry in 1981. Modern excavating equipment was brought into play by several companies that were awarded mining rights in the areas to be flooded by the Mahaweli River diversion program. Since about 13,000 hectares of

potential gem-bearing gravels would be permanently inundated, the Government decided to invite foreign companies to bid for the mining rights and extract what gems could be obtained before the waters began to rise. The Government-owned State Gem Corp. had the option to buy all stones, and profits would be shared on an equal basis.

Neither weight of production nor value of the gem output was available in 1981. It was speculated, however, that over 1 million carats of rough stones may have been removed by the accelerated mining methods in 1981.

Sri Lanka was a major producer of high-grade natural graphite, ranking among the top 10 world producers. Total shipments of graphite in 1981 were valued at \$4.5 million, a decrease of 6% in value compared with 1980 statistics. This was the third consecutive year that production has declined. To increase production, the Asian Development Bank approved technical assistance for a graphite mining project. The assistance was to formulate a program that would help produce an additional 17,000 tons of graphite ore annually. It will involve the rehabilitation and expansion of existing mines of the State Mining and Mineral Development Corp., the reopening of local abandoned mines, and the exploration and evaluation of the country's graphite potential.

Oil exploration activity was stepped up in Sri Lanka after the September 1980 Indian announcement of an oil strike in Cauvery Basin on the Indian side of Palk Strait. Gravity, magnetic, and seismic surveys were begun in late 1980 by Prakla Seismos GmbH of the Federal Republic of Germany. The surveys covered mostly Blocks 1, 2, 10, and 11 along the northwest quadrant of the island and were completed in January 1981.

Interpretation of the survey data resulted in Cities Service Sri Lanka Petroleum Corp. (Citco) choosing a drilling site, Pearl-1, in Block 11 south of Mannar Island. Drilling began on September 28, 1981, and proceeded to 3,048 meters before the well was abandoned as a dry hole. Citco then moved the jack-up drilling rig Apollo 1 to the Palk Strait, a few kilometers from the successful Indian well. The new well, Pedro 1, was drilled to 1,740 meters where it encountered what was believed to be basement rock. There was some question whether this meant no oil or whether the rock acted as a lid over a large oil reservoir. At yearend, rock samples were being analyzed to deter-

mine if the well should be drilled deeper.⁴⁰

Several other companies hold exploration or production-sharing agreements with Ceylon Petroleum Corp. (CPC) for the offshore areas surrounding the island. Any of these could begin drilling operations in 1982 if the survey results show favorable conditions in their areas.

Discovery of even modest amounts of oil could be very important to the Sri Lanka economy. The country produced no oil or gas domestically. The cost of crude petroleum imports has become a major economic problem, increasing from \$121 million in 1975 to \$442 million in 1980. Expenditures for 1981 were expected to be about the same for crude oil, but refined product costs were projected to increase about 40% in 1981. In past years, some of the imported petroleum was exported in the form of bunker fuel oil, jet fuel, and naphtha. This changed in 1981 with the opening of the fertilizer plant, which uses naphtha as raw material. Increased amounts of fuel oil were scheduled for use in electric power generation as well.

Caltex Petroleum Corp. (United States) has proposed investing in a joint venture to

take over the distribution of liquefied petroleum gas (LPG) in Sri Lanka. CPC produces 7,000 tons per year at its refinery in Sapugaskanda near Colombo, but demand exceeds current supply. Caltex felt that with increased storage facilities considerably more LPG would be distributed. The refinery capacity could be increased easily to 11,000 tons per year.

CPC reportedly let a contract to Ocean Resources Div. of Williams Bros. Engineering Co. (United States) for consulting services on installation of a single point mooring facility. The facility would transfer crude oil to the refinery at Sapugaskanda, which currently receives its crude oil supplies via transfer lightering barges.⁴¹

Coastal Corp., a Texas-based oil company, was to obtain a 25-year lease for the 1-million-ton oil storage tank farm at China Bay, Trincomalee. A new company, Coastal (Lanka) Ltd., is to be set up to recondition and operate the 99-tank facility, which was built by the British during World War II and had been unused probably since 1964. The facility would be used as a deepwater export terminal for crude and refined products.

Table 13.—Sri Lanka: Exports and reexports of mineral commodities

(Metric tons unless otherwise specified)

Commodity	1979	1980	Destinations, 1980	
			United States	Other (principal)
METALS				
Aluminum metal including alloys, all forms -----	7	135	--	Mainly to Maldives.
Copper metal including alloys, all forms value -----	\$3,117	\$7,147	--	China \$6,947; United Kingdom \$200.
Iron and steel metal, all forms -----	7	246	--	Mainly to Maldives.
Lead:				
Oxides and hydroxides -----	452	303	--	Republic of South Africa 290; Bangladesh 13.
Metal including alloys, all forms -----	334	379	--	Republic of South Africa 270; United Kingdom 50; Hong Kong 35.
Platinum-group metals including alloys, unwrought and partly wrought value -----	\$535	--		
Silver metal including alloys, unwrought and partly wrought -----	\$281	\$54,558	--	United Kingdom \$46,872; Abu Dhabi \$4,133; Singapore \$3,502.
Tin metal including alloys, all forms do -----	\$5	\$305	--	Canada \$287; United Kingdom \$18.
Titanium ore and concentrate -----	32,640	23,970	--	All to Japan.
Uranium and thorium, depleted metal kilograms -----	--	15	--	All to Canada.
Zinc oxides and peroxides ----- do -----	--	50	--	All to Maldives.
Other:				
Ores and concentrates -----	16,500	11,900	--	Netherlands 10,000; Japan 1,900.
Ash and residue containing non-ferrous metals ----- kilograms -----	9	--		
Base metals including alloys, all forms value -----	\$556	\$3,729	--	West Germany \$1,995; Norway \$1,275.

See footnotes at end of table.

Table 13.—Sri Lanka: Exports and reexports of mineral commodities —Continued

(Metric tons unless otherwise specified)

Commodity	1979	1980	Destinations, 1980	
			United States	Other (principal)
NONMETALS				
Abrasives, n.e.s.: Grinding and polishing wheels and stones ----- value_	348	34	--	Australia \$20; United Kingdom \$14.
Boron materials: Oxide and acid do_	--	81	--	All to Maldives.
Cement_	308	200	--	Mainly to Maldives.
Clays and clay products:				
Crude_	4	11	(*)	United Kingdom 9.
Products:				
Nonrefractory_	11,566	13,344	1,682	Singapore 5,528; Hong Kong 2,530.
Refractory including nonclay brick_	7	12	1	Iran 10.
Fertilizer materials:				
Crude and manufactured_	275	6	--	Singapore 2; Abu Dhabi 2.
Ammonia kilograms_	--	12	--	All to Maldives.
Graphite, natural_	11,154	6,604	1,421	Japan 2,487; Taiwan 750; United Kingdom 582.
Mica:				
Crude including splittings and waste_	555	630	(*)	Japan 609; Belgium 21.
Worked including agglomerated splittings kilograms_	100	10	--	All to Switzerland.
Precious and semiprecious stone including diamond:				
Natural carats_	590,000	275,562	18,022	Hong Kong 76,619; Japan 56,579; West Germany 42,195.
Synthetic and reconstructed do_	10,577	58,814	58,439	Japan 322.
Salt and brine_	210	6,180	--	Kenya 6,000; Maldives 180.
Sodium and potassium compounds, n.e.s kilograms_	10	--	--	
Stone, sand and gravel excluding metal-bearing sand_	339	53	3	Japan 31; Maldives 16.
Sulfur:				
Pyrites, unroasted kilograms_	5	2	--	All to United Kingdom.
Sulfuric acid do_	160	--	--	
Other:				
Activated natural minerals_	855	668	346	United Kingdom 247; Republic of South Africa 45.
Halogens kilograms_	144	--	--	
Building materials of asphalt, asbestos and fiber cements, unfired non-metals value_	\$53,387	\$451	--	All to Maldives.
MINERAL FUELS AND RELATED MATERIALS				
Carbon black and gas carbon kilograms_	(*)	14	--	All to United Kingdom.
Coke and semicoke_	20	--	--	
Hydrogen, helium, rare gases kilograms_	890	470	--	All to Maldives.
Petroleum and refinery products:				
Partly refined petroleum 42-gallon barrels_	708	2,104	--	Do.
Refinery products:				
Nonbunker:				
Gasoline do_	1,608	418,136	--	People's Democratic Republic of Yemen 214,768; Netherlands 202,531.
Distillate fuel oil do_	241	--	--	
Residual fuel oil do_	371,432	1,248,454	--	India 868,525; Philippines 150,524; Egypt 122,421.
Lubricants do_	(*)	15	--	All to Maldives.
Liquefied petroleum gas do_	37	25	--	Do.
Other do_	353	30	--	Mainly to Maldives.
Bunker:				
Jet fuel do_	594,400	669,345	--	
Distillate fuel oil do_	500,163	430,375	--	
Residual fuel oil do_	2,188,476	2,080,244	--	
Lubricants do_	4,040	5,292	--	
Mineral tar and other coal-, petroleum-, and gas-derived crude chemicals_	81,392	66,956	--	Taiwan 44,958; People's Democratic Republic of Yemen 21,998.

¹Reported quantity exported valued at \$122,817; unreported quantity valued at \$114,515 also exported.

²Excludes unreported quantity valued at \$1,462.

³Less than 1/2 unit.

Table 14.—Sri Lanka: Imports of mineral commodities¹

(Metric tons unless otherwise specified)

Commodity	1979	1980	Sources, 1980	
			United States	Other (principal)
METALS				
Aluminum:				
Ore and concentrate	--	210	--	All from India.
Oxides and hydroxides	205	17	(²)	Japan 13; India 3.
Metal including alloys:				
Scrap	--	7	--	Mainly from Hong Kong.
Unwrought	18	4	--	Hong Kong 2; United Kingdom 2.
Semimanufactures	6,698	7,834	(²)	Norway 2,686; India 2,338; Hong Kong 715.
Arsenic oxides and acids .. kilograms ..	2	1	--	All from United Kingdom.
Chromium:				
Ore and concentrate	--	54	--	All from Netherlands.
Oxides and hydroxides	8	10	--	United Kingdom 6; West Germany 3.
Cobalt oxides and hydroxides				
..... kilograms ..	--	750	--	United Kingdom 500; West Germany 250.
Copper:				
Matte	9	--	--	
Metal including alloys:				
Unwrought including scrap	52	3	(²)	United Kingdom 2; China 1.
Semimanufactures	8,040	1,500	2	Australia 686; United Kingdom 278; Japan 217.
Gold metal including alloys, unwrought and partly wrought ³ .. troy ounces ..	16,365	NA	--	All from United Kingdom.
Iron and steel:				
Ore and concentrate	118	--	--	
Metal:				
Scrap	50	(⁴)	--	Mainly from West Germany.
Pig iron, cast iron, spiegeleisen	122	322	136	United Kingdom 120; Singapore 35.
Ferroalloys	132	93	--	Australia 37; U.S.S.R. 21; China 10.
Steel, primary forms	50,834	56,642	--	Republic of South Africa 40,294; Zimbabwe 12,943; U.S.S.R. 3,404.
Semimanufactures	94,008	101,193	290	Japan 50,494; United Kingdom 20,355; Republic of South Africa 10,604.
Lead:				
Ore and concentrate	1	--	--	
Oxides	8	9	--	West Germany 5; United Kingdom 3.
Metal including alloys:				
Unwrought	500	5462	10	Australia 402; United Kingdom 143.
Semimanufactures	79	124	(²)	Australia 99; Belgium 15.
Magnesium metal including alloys, all forms .. value ..	\$33,260	\$3,027	\$2,210	United Kingdom \$817.
Manganese:				
Ore and concentrate	1,018	1,744	--	Singapore 1,679; United Kingdom 50; Belgium 15.
Oxides	408	534	--	United Kingdom 199; Japan 130; Singapore 120.
Mercury .. 76-pound flasks ..	46	13	--	United Kingdom 12; West Germany 1.
Molybdenum metal including alloys, all forms .. kilograms ..	826	60	--	United Kingdom 29; Japan 19; Sweden 12.
Nickel metal including alloys, all forms ..	15	10	(²)	United Kingdom 7; Belgium 2.
Platinum-group metals including alloys, unwrought and partly wrought				
..... troy ounces ..	257	386	322	United Kingdom 64.
Silver metal including alloys, unwrought and partly wrought				
..... do.	3,959	4,180	--	United Kingdom 2,186; Sweden 1,608.
Tin:				
Ore and concentrate	--	50	--	All from Singapore.
Oxides and hydroxides .. value ..	\$44	\$15,069	--	All from United Kingdom.
Metal including alloys:				
Scrap .. do.	\$88,546	\$12,526	\$12,526	
Unwrought	12	16	--	Malaysia 9; Hong Kong 3; Denmark 2.
Semimanufactures	41	34	--	Republic of South Africa 30; Malaysia 4.

See footnotes at end of table.

Table 14.—Sri Lanka: Imports of mineral commodities¹—Continued

(Metric tons unless otherwise specified)

Commodity	1979	1980	Sources, 1980	
			United States	Other (principal)
METALS—Continued				
Titanium oxides and hydroxides.....	81	48	(²)	United Kingdom 47.
Tungsten metal including alloys, all forms	1	15	(²)	Mainly from China.
Uranium and thorium:				
Compounds	7	69	66	China 3.
Depleted metal	11	--	--	--
Zinc:				
Oxides and hydroxides	565	820	2	Republic of South Africa 365; West Germany 134; United Kingdom 130.
Metal including alloys:				
Scrap	3	5,000	--	Mainly from Australia.
Dust (blue powder)	460	302	--	All from United Kingdom.
Unwrought	551	672	--	Australia 305; Japan 221; China 100.
Semimanufactures	50	69	(²)	Australia 55; France 10.
Other:				
Ores and concentrates:				
Of precious metals	--	\$48,924	--	All from India.
Unspecified	2	2	--	Mainly from Sweden.
Oxides, hydroxides, peroxides	2	12	(²)	Belgium 10; United Kingdom 2.
Metals:				
Metalloids	6,379	99	(²)	United Kingdom 45; India 35; Singapore 11.
Alkali, alkaline-earth, rare-earth metals	4,015	88	4	Sweden 71; United Kingdom 13.
Pyrophoric alloys, ferrocerium				
value	\$22	\$42,597	--	All from Republic of Korea.
Waste and sweepings of precious metals	\$91	--	--	--
Base metals including alloys, all forms	9,935	153	--	Japan 150; United Kingdom 3.
NONMETALS				
Abrasives, n.e.s.:				
Natural: Pumice, emery, corundum, etc	38	41	23	India 11; United Kingdom 3.
Artificial: Corundum	1	2	--	India 1; United Kingdom 1.
Dust and powder of precious and semi-precious stones including diamond	\$3,233	\$1,937	\$378	India \$535; Japan \$373; West Germany \$151.
Grinding and polishing wheels and stones	238	127	(²)	Belgium 26; United Kingdom 21; Japan 20; Netherlands 16.
Asbestos, crude	11,780	6,188	--	Canada 5,872; United Kingdom 200.
Barite and witherite	4	47	--	All from China.
Boron materials: Oxide and acid	42	13	10	India 3.
Cement	54,266	215,168	--	Philippines 56,863; Singapore 55,234; Japan 39,812.
Chalk	102	144	--	United Kingdom 137; Japan 6.
Clays and clay products:				
Crude	5,769	1,696	45	Japan 601; United Kingdom 571; India 334.
Products:				
Nonrefractory ⁸	\$4,534	2,382	--	India 2,041; United Kingdom 340.
Refractory including nonclay brick	1,449	4,529	1	U.S.S.R. 1,704; Japan 724; West Germany 596.
Diamond:				
Gem, not set or strung	\$1,357,894	\$42,405	--	Belgium \$42,133; United Kingdom \$272.
Industrial	\$127	\$1,952	--	All from United Kingdom.
Powder and dust	NA	8,425	50	United Kingdom 8,070; India 175.
Diatomite and other infusorial earth	3,271	3,037	7	Thailand 3,000; India 24.
Feldspar, fluorspar, leucite, nepheline	370	1	--	All from Japan.
Fertilizer materials:				
Crude	9	27,502	--	Egypt 27,500.
Manufactured:				
Nitrogenous	213,723	201,164	8,075	Japan 68,165; Republic of Korea 39,204; Egypt 16,500.
Phosphatic	26,721	49,963	500	Singapore 11,000; Republic of South Africa 10,200; Tunisia 7,800.
Potassic	38,529	94,934	(²)	Canada 56,318; West Germany 33,115.
Other including mixed	11,599	29,883	12	Republic of Korea 16,000; Republic of South Africa 13,761.
Ammonia	291	133	(²)	United Kingdom 83; Netherlands 28.
Graphite:				
Natural	1	--	--	--
Artificial	12	--	--	--

See footnotes at end of table.

Table 14.—Sri Lanka: Imports of mineral commodities¹ —Continued

(Metric tons unless otherwise specified)

Commodity	1979	1980	Sources, 1980	
			United States	Other (principal)
NONMETALS —Continued				
Gypsum and plasters	4,909	198,965	--	India 198,489; West Germany 384.
Lime	3,361	324	--	Singapore 140; China 102; Republic of South Africa 54.
Magnesite	3	5	--	Mainly from Japan.
Mica:				
Crude including splittings and waste	11	21	(²)	India 20.
Worked including agglomerated splittings kilograms	119	41	(²)	United Kingdom 36; Singapore 5.
Pigments, mineral:				
Crude, natural	29	11	--	India 10; United Kingdom 1.
Iron oxides, processed	391	850	(²)	West Germany 662; India 65; United Kingdom 65.
Precious and semiprecious stones:				
Natural excluding diamond carats	2,624	717,206	--	West Germany 710,000; Thailand 7,003.
Synthetic and reconstructed including diamonds ³ do	7,391	11,866	10,000	Japan 1,866.
Pyrites, roasted kilograms	--	1	--	All from United Kingdom.
Salt and brine	5	6	--	United Kingdom 4; Singapore 1.
Sodium and potassium compounds, n.e.s.:				
Caustic potash	9	35	--	United Kingdom 16; France 12; India 5.
Caustic soda	8,677	4,933	(²)	United Kingdom 3,251; West Germany 1,500.
Soda ash	5,532	2,714	--	United Kingdom 901; Kenya 685; Singapore 500.
Stone, sand and gravel:				
Dimension stone:				
Crude and partly worked	80	143	(²)	India 134; United Kingdom 6; Sweden 3.
Worked	146	60	--	China 54; United Kingdom 3.
Dolomite, chiefly refractory-grade	--	5	--	All from Norway.
Gravel and crushed rock	101	397	--	India 155; France 83; Italy 72; Japan 66.
Limestone excluding dimension kilograms	60	41	--	Mainly from India.
Quartz and quartzite value	\$8,684	\$161	\$161	
Sand excluding metal-bearing	6	1	--	Mainly from United Kingdom.
Sulfur:				
Elemental:				
Other than colloidal	520	431	--	Thailand 250; Poland 50; India 27.
Colloidal	317	642	--	India 370; Thailand 145; Poland 100.
Dioxide kilograms	49,283	4	--	All from United Kingdom.
Sulfuric acid	518	697	(²)	Singapore 365; Thailand 275; Netherlands 35.
Talc, steatite, soapstone, pyrophyllite	1,585	1,215	228	China 837; India 135.
Other:				
Crude	4,846	3,229	--	West Germany 2,700; Singapore 499.
Oxides, hydroxides, peroxides of barium, magnesium, strontium	9	11	1	Japan 5; United Kingdom 2; Thailand 2.
Halogens kilograms	3,289	43	--	United Kingdom 31; West Germany 12.
Activated natural mineral products	199	185	--	Japan 125; India 35; United Kingdom 23.
Building materials of asphalt, asbestos and fiber cements, unfired non-metals	8,244	19,479	(²)	Indonesia 13,653; Singapore 3,970; Malaysia 1,830.
MINERAL FUELS AND RELATED MATERIALS				
Asphalt and bitumen, natural	1	2	--	Singapore 1; United Kingdom 1.
Carbon black and gas carbon	3,426	3,310	660	India 1,392; Romania 716; Thailand 315.
Coal, all grades including briquets	247	288	--	Republic of South Africa 122; Thailand 100; United Kingdom 65.
Coke and semicoke	1,897	2,429	35	Japan 2,048; United Kingdom 165; Republic of South Africa 150.
Hydrogen, helium, rare gases	22	13	(²)	Singapore 11; Japan 2.

See footnotes at end of table.

Table 14.—Sri Lanka: Imports of mineral commodities¹—Continued

(Metric tons unless otherwise specified)

Commodity	1979	1980	Sources, 1980	
			United States	Other (principal)
MINERAL FUELS AND RELATED MATERIALS—Continued				
Petroleum and refinery products:				
Crude and partly refined thousand 42-gallon barrels...	10,613	13,722	--	Saudi Arabia 6,968; Iraq 3,511; Iran 3,243.
Refinery products:				
Gasoline ___ 42-gallon barrels...	164	8,778	--	All from Italy.
Kerosine and jet fuel ___ do...	647,326	612,897	--	Singapore 310,577; Kuwait 302,320.
Distillate fuel oil ___ do...	809,549	223,372	--	Singapore 154,191; Kuwait 69,181.
Lubricants ___ do...	24,388	26,404	586	Singapore 12,570; Belgium 8,326; West Germany 1,670.
Other:				
Petroleum gases, liquefied and gaseous ___ value...	\$46	\$11,039	--	France \$9,118; United Kingdom \$1,860.
Mineral jelly and wax 42-gallon barrels...	13,931	7,106	44	China 6,052; West Germany 489.
Petroleum coke, bitumen, other residues ___ do...	35,881	60,620	--	Bahrain 34,675; Singapore 25,936.
Bituminous mixtures ___ do...	2,136	162	(²)	India 124; Singapore 24.
Unspecified ___ do...	214,683	53,153	(²)	Singapore 50,704; Belgium 1,249; West Germany 1,197.
Mineral tar and other coal-, petroleum-, and gas-derived crude chemicals ___	64	129	3	Republic of South Africa 50; United Kingdom 48; West Germany 11.

¹Revised. NA Not available.²The quantities reported in this table are the total quantities reported in the official trade statistics of Sri Lanka; however, additional, unreported quantities imported by Sri Lanka are indicated in the official trade statistics only by value and have generally not been reported in this table.³Less than 1/2 unit.⁴Excludes unreported quantity valued at \$51,841 imported from the United Kingdom in 1979 and unreported quantity valued at \$26,736 imported in 1980.⁵Unreported quantity valued at \$41,226.⁶Excludes unreported quantity valued at \$400,326.⁷Excludes unreported quantity valued at \$2,002.⁸May include dust and powder of diamond.⁹Excludes unreported quantity valued at \$441,985 in 1979 and \$210,746 in 1980.¹⁰In 1979, the quantity reported imported was valued at \$593, and an unreported quantity was valued at \$4,224; in 1980, the quantity reported imported was valued at \$1,451, and an unreported quantity was valued at \$5,603.**VIETNAM⁴²**

In 1981, Vietnam produced a small amount of several minerals including coal, phosphate, tin, chromite, antimony, iron ore, clays, building stone, manganese, cement, salt, graphite, and zinc. Natural gas was produced and used industrially for the first time. Coal, phosphate, tin, and chromite were produced in sufficient amounts that a surplus was available for export. There were also known deposits of bauxite, lead, silver, and titanium minerals, but their status was unknown. In past years, the mining sector accounted for up to 5% of the GNP, but Vietnam releases official figures on only a few selected commodities and seldom gives sector totals. Vietnam was not an important world producer of any mineral commodity in 1981.

Economic conditions continued to decline

in 1981. Press comments, both Vietnamese and foreign, paint a picture worse than 7 years ago when the United States ended its involvement. Apparently massive Soviet aid, estimated between \$3 million and \$6 million per day, has not been sufficient to maintain even a Spartan standard of living for most of the population. Several reasons have been given for the problems, with high Government officials admitting that corruption, bribery, and mismanagement were prominent contributors to the country's woes. The policy of maintaining a 1-million-person military force, many of them in active conflict in Kampuchea, was extremely expensive and consumed both workers and resources that could be used domestically to help in industrial and agricultural development.

Favorable weather and Government-granted economic incentives to farmers combined to produce a record food grain harvest of over 15 million tons in 1981. Despite the good crop, total food available was not enough to feed the 55 million population. Large amounts of food had to be imported during the year, and the monthly food ration remained at a bare subsistence level. The target for 1982 food production was set at 16 million tons.

In the industrial sector, the Government gave priority to projects directly benefiting agriculture such as electric power, irrigation, coal and fertilizer production, and the transportation system. The big Pha Lai thermal powerplant was being built with Soviet aid. Its planned first-stage completion date was late 1983, and if attained, its power output would help reduce critical shortages in the Hanoi area.

In mid-1981 the state bank devalued the dong. The new equivalence was dong-9.09=US\$1.00. In addition the Government banned circulation of foreign currency and imposed stricter controls on gold, silver, platinum, and diamonds. The measures failed to strengthen the dong, and on the black market the U.S. dollar was reportedly worth dong60.⁴³

Major economic and technical agreements were signed with the Soviet Union during 1981. The Soviets are to assist with more than 100 industrial projects designed to increase production of electricity, fertilizers, etc. Trade between the two countries would also be greatly increased.

Official trade figures were not available, but a partial list of exports to four market economy countries showed about \$50 million in 6 to 10 months of 1981 versus \$51 million in the same period in 1980. Imports from the same period and countries showed a considerable rise from \$138 million in 1980 to \$213 million in 1981. To cut down trade deficits, the Vietnamese were striving to increase their exports wherever possible. Agricultural products and handicrafts were to furnish most of the increase. The most likely areas in the mineral sector would be coal, phosphate, and tin.

COMMODITY REVIEW

Metals.—Tin.—The Vietnamese, with technical and economic aid from the Soviet Union, were in the middle of modernizing and expanding their small tin industry. At least two mining areas were operating, and one was in the earliest stages of con-

struction during 1981.

A new mining area was nearly ready to open at the old Tinh Tuc Mine in Cao Bang Province, after 3 years of construction. The mining and concentrating system, formerly manual, was mechanized and automated, and a new ore separation plant was built. The old operation was continued without interrupting the normal production rate.

The new ore processing plant will be able to recover the finer grained ore particles, formerly lost, and will recover 96% of the tin present versus 83% from the old facility. The new mechanization at the mine will presumably allow an increase in the ore production rate was well.

In Ha Tuyen Province, the Son Duong mining area was nearly ready to produce ore at two mines designed by the nonferrous metallurgical institute of the Ministry of Engineering and Metals. The mines were referred to as Khuon Phay and Bac Lung and required a capital investment of about \$6 million. It was believed that Khuon Phay would eventually have a capacity of 300,000 cubic meters of ore per year. The ore grade was not revealed, but that amount of ore in neighboring countries could yield over 1,000 tons of concentrate. Construction was apparently still underway at Bac Lung. The Vietnamese press stated that after completion the Bac Lung mining zone would have a tin ore output similar to that of the Tinh Tuc Mine.

Construction of support facilities was underway at Qui Hop tin mine, also spelled Quy Hop, in Nghe Tinh Province. Construction of the mine was planned to begin in 1982 as part of the Government's industrial goal. Completion and successful operation of these new projects could greatly increase the country's tin output. Vietnam's tin consumption is not large and most of the production would be exported to furnish much needed foreign exchange.

Nonmetals.—Cement.—One of Vietnam's most important industrial projects was partially completed during 1981. On December 22, 1981, the first of two rotary kilns was fired on a trial basis at the Bim Son cement plant, and a 70-ton test batch was ground and bagged before the end of the year. The No. 1 production line will have a capacity of 600,000 tons per year of high-quality cement, urgently needed by the Vietnamese economy. The plant had been a showpiece of Russian-Vietnamese industrial cooperation since construction began 46 months before. The December 1981 completion date was

only accomplished by many months of maximum round-the-clock effort on the part of thousands of laborers and virtually every skilled worker who could be pressed into service. The original planned startup date was in 1980.

Reading between the lines of the Vietnamese press communiques, it was apparent that progress on the No. 2 production line, a duplicate of the No. 1 kiln, was seriously affected by the catchup work on the first kiln. The No. 2 kiln's new planned completion date was set for November 7, 1982. In addition, it was by no means certain whether the system that will supply raw materials to the kilns was ready to begin to operate in a continuous and reliable manner.

As late as October 1981, top Government officials were referring to plans insuring adequate electric power supplies, and that plans must be drawn up for the timely delivery of raw materials and transport of finished cement from the factory. A lack of reliable transport facilities has plagued the country for years and has been a major constraint to the timely completion of ambitious industrial projects. Such candid remarks as were made in late 1981 could indicate that this plant is a long way from producing 600,000 tons of cement in 1982.

Two other large rotary kiln cement plants were under construction during 1981. Both were originally scheduled for completion before yearend 1981. One was a Danish- and Japanese-aided plant at Hoang Thach, southeast of Hanoi; the other was a French-aided expansion of the old Ha Tien cement plant, 240 kilometers west of Ho Chi Minh City. Each plant will have more than a 1-million-ton-per-year capacity.

There was virtually no publicity about either of these projects during 1981. It was very likely that skilled workers and possibly equipment were borrowed from these construction sites to complete the Bim Son plant. Construction progress was probably minimal during the year, and completion of the plants was not expected until well into 1983 or beyond. The same infrastructure constraints will be encountered for these plants when completed as were mentioned for the Bim Son plant.

The Government's planned cement production for 1985 was 2.0 million tons. This may reflect a realistic belief that only the Haiphong plant (500,000 tons per year), the old Ha Tien plant (300,000 tons per year), the mini-cement plants (200,000 tons per

year), and the by then completed Bim Son (1 million tons per year), actually will be in production.

Fertilizer Materials.—Workers in Ho Chi Minh City completed an organic fertilizer plant with Danish aid. The plant will convert 300,000 tons per year of dry garbage from the urban area into composted organic fertilizer. Processed organic material and green manure was extensively used throughout Vietnam both because of tradition and because chemical fertilizers were in very short supply and expensive when available.

Parts of the Soviet-aided expansion project at the Lam Thao superphosphate fertilizer plant were completed during the year, and construction continued on remaining sections. The plant was 20 years old and apparently has been poorly maintained. A constant problem of corrosion and broken equipment has adversely affected the output of the plant. The plant expansion will increase the original 200,000-ton-per-year capacity and restore the old equipment to a more reliable operating condition.

The Lam Thao superphosphate plant and the apatite grinding plants around the country were supplied with raw material from the Lao Cai apatite mine near the border with China. Lao Cai was a major apatite producer before the border hostilities in March 1979. At that time, virtually all of the mechanized equipment at the mine and much of the infrastructure supporting the operation was destroyed. Repair work has gone slowly, and production during 1981 was probably more than that in 1980 but nowhere near the former production levels. Early in 1981, there was a problem with transporting the ore out of the mining district. By midyear, however, the ore was reportedly being transported as fast as it was being extracted at the time. No official figures were released for the Lao Cai Mine's output in either 1981 or 1980.

Mineral Fuels.—*Coal.*—Coal was Vietnam's major energy source and has been, in prior years, a main source of foreign exchange through sizable anthracite exports. After a very poor year in 1980, production made a modest gain in 1981. The production goals had been revised downward very substantially during 1980, and the production level achieved in 1981 actually represented a disastrous failure of the mid-1970's Government plan to reach 10 million tons of washed coal by 1980.

Despite the construction of several new mines and the modernization of older

mines, the production levels desired have not even been approached by most of the coal industry. Some problems have been solved, and enough new capacity has begun operating to allow the production gain shown in table 1.

Two major problems, transportation and worker motivation, have not been solved and until they are solved industry in general and coal production in particular will continue to have difficulty operating smoothly.

The problem of transportation was mentioned most frequently during 1981 by Government officials. In many cases the coal has been mined but cannot be efficiently moved to its destination. Workers have difficulty getting to the mines. Several local sections of railroad were critically important but either were not completed or were built long ago and were in such poor repair as to be only marginally operable. Spare parts were in short supply so that a high proportion of rail equipment was inoperable at any given time. To speed up the movement of coal and other products, Vietnam has recently imported over an estimated \$50 million worth of Indian rail equipment. In June 1981, it was expected to sign an additional agreement to import 200 to 300 new coal cars.

Waterborne coal transport suffered from the same problems. Equipment was in short supply, new barges and tugs were not completed on schedule, and maintenance of equipment was neither adequately nor quickly performed. Again, spare parts were difficult to acquire and seldom available where they were needed.

The highway sector may have been in the worst shape of all. Maintenance of a poorly engineered road network was a constant problem. Truck traffic was forced to move at very low speeds because of deterioration of road surfaces, particularly in the hilly sections of the country. This increased the turnaround time for a given trip. In turn, a larger fleet of trucks was necessary to move the required coal quotas, further aggravating the already severe vehicle maintenance problems.

Another transport problem mentioned by industry leaders was that of incorrect or irrational delivering of coal. Plants needing lump coal were sent powdered coal, while those needing powdered coal received lump

coal that then had to be crushed before it could be used. Poor quality coal was delivered to cement plants, degrading the output of the kilns. These types of administrative problems were very costly and apparently accounted for a considerable waste of resources, which could be put to better use by proper planning and management in the upper levels of the coal mining organization.

The second major problem discussed in the Vietnamese press was that of motivating the work force. Several types of problems were mentioned including relative pay scales, lack of food and medical supplies, safety conditions in the mines, workers' housing and recreational facilities, inadequate job training, and lack of spare parts resulting in the workers' inability to meet production norms and hence earn bonuses.

The above problems have resulted in an excessive amount of absenteeism and workers resigning their jobs. Those that continue to work have little incentive or opportunity to increase production. The Vice Minister of Mines and Coal stated that in one 3-month period up to 32% of the workers took leave of absence and a total of nearly 2,000 workers quit their jobs, many of them were the skilled quarry workers and vehicle drivers.

Although a number of changes have been made and the industry leaders are well aware of the problems, there appeared to be very little progress during 1981 toward effectively solving these problems at the workers' level. Until most of these transport and labor troubles are solved, the production goal of 10 million tons per year will be difficult, if not impossible, to achieve.

Natural Gas and Petroleum.—Soviet technicians have been helping in the exploration for gas and oil for the last 10 years. A total of 20 wells were believed drilled in that period, mostly in a geological trough between Hanoi and the coast.

The search finally resulted in a gas discovery well in the Tien Hai District of Thai Binh Province, 95 kilometers southeast of Hanoi. The 1,200-meter-deep well was completed for production. It was then decided that a gas turbine-powered electric generator system would be the best way to quickly and economically utilize the small gas discovery.

Table 15.—Vietnam: Apparent exports of mineral commodities¹

(Metric tons unless otherwise specified)

Commodity	1979	1980 ^P	Destinations, 1980	
			United States	Other (principal)
METALS				
Antimony metal	59	10		
Chromium: Chromite	13,516	9,105	--	All to Japan.
Tin metal including alloys:			--	Japan 9,055; France 50.
Unwrought	80	5	--	All to Japan.
Semimanufactures	1	NA	--	NA.
NONMETALS				
Clay products:				
Nonrefractory	173	56	--	Japan 29; Saudi Arabia 16; Italy 11.
Refractory		48	--	All to Italy.
Salt	2,020	249	--	All to Hong Kong.
Stone, sand and gravel:				
Dimension stone:				
Crude and partly worked		198	--	Hungary 150; Japan 48.
Worked	8	1	--	All to France.
Talc and steatite		100	--	All to Indonesia.
MINERAL FUELS AND RELATED MATERIALS				
Coal:				
Anthracite and bituminous coal	588,994	416,418	--	Japan 334,255; Sri Lanka 73,463.
Briquettes of anthracite and bituminous coal	7,695	4,000	--	All to Thailand.
Petroleum refinery products:				
Kerosine	1,225	120,939	--	All to Spain.
Lubricants	1,289	NA	--	NA.

^PPreliminary. NA Not available.¹Owing to a lack of official trade data published by Vietnam, this table should not be taken as a complete presentation of this country's mineral trade. Unless otherwise specified, these data have been compiled from United Nations information and data published by the partner trade countries.**Table 16.—Vietnam: Apparent imports of mineral commodities¹**

(Metric tons unless otherwise specified)

Commodity	1979	1980 ^P	Sources, 1980	
			United States	Other (principal)
METALS				
Aluminum:				
Oxides and hydroxides	--	(²)	--	All from Japan.
Metal including alloys, semimanufactures	786	781	--	Hungary 650; Japan 107; Sweden 19.
Chromium oxides and hydroxides	10	NA	--	NA.
Cobalt oxides and hydroxides	4	6	--	All from Japan.
Copper:				
Sulfate	30	NA	--	NA.
Metal including alloys, semimanufactures	73	39	--	France 33; Sweden 4.
Iron and steel metal:				
Pig iron, cast iron, powder, shot	3,200	NA	--	NA.
Ferroalloys	--	440	--	All from Japan.
Semimanufactures:				
Bars, rods, angles, shapes, sections	39,044	³ 23,474	--	Poland 16,077; Japan 2,877; ³ Italy 1,632.
Universals, plates, sheets	21,975	6,070	--	Hungary 3,137; Japan 1,294; U.S.S.R. 557.
Hoop and strip	1,444	501	--	Japan 352; France 115.
Rails and accessories	206	20	--	All from Sweden.
Wire	3,848	4,646	--	Japan 279; ⁴ France 198; Belgium-Luxembourg 92.
Tubes, pipes, fittings	4,835	3,348	--	Singapore 1,533; Sweden 1,090.
Castings and forgings, rough	1,004	NA	--	NA.
Lead oxides and hydroxides	5	NA	--	NA.
Manganese oxides and hydroxides	200	200	--	All from Japan.
Mercury	30	87	--	Do.
Molybdenum metal including alloys, all forms	--	144	--	Do.
Nickel metal including alloys, semimanufactures	32	⁵ 2	--	All from West Germany.

See footnotes at end of table.

Table 16.—Vietnam: Apparent imports of mineral commodities¹ —Continued

(Metric tons unless otherwise specified)

Commodity	1979	1980 ^P	Sources, 1980	
			United States	Other (principal)
METALS —Continued				
Silver metal including alloys, unwrought and partly wrought value, thousands	--	\$1	--	All from Sweden.
Tin metal including alloys, semi-manufactures kilograms	--	22	--	All from Hong Kong.
Titanium oxides	(²)	100	--	All from Japan.
Tungsten metal including alloys, all forms kilograms	181	274	--	Do.
Zinc:				
Oxides and peroxides	2	NA	--	NA.
Metal including alloys:				
Unwrought	--	397	--	All from Japan.
Semimanufactures	--	1	--	All from Sweden.
Other, n.e.s.:				
Oxides, hydroxides, peroxides	62	45	--	Japan 37; Sweden 8.
Metalloids	--	2	--	All from Japan.
NONMETALS				
Abrasives:				
Natural: Pumice, emery, corundum, etc	150	1	--	All from Sweden.
Grinding and polishing wheels and stones	3	41	--	Japan 38.
Barite and witherite	1,170	3,705	--	All from Singapore.
Boric oxide and acid	--	40	--	All from Japan.
Cement	78,213	76,300	--	U.S.S.R. 53,000; Singapore 17,484; Japan 5,115.
Clays and clay products:				
Crude:				
Bentonite	717	588	--	All from Singapore.
Kaolin	--	471	--	All from Sweden.
Other, unspecified	190	9	--	All from France.
Products:				
Nonrefractory	882	1,657	--	Italy 1,512; Singapore 36; West Germany 31.
Refractory	9,277	859	--	France 475; Hungary 171; Japan 170.
Diatomite and other infusorial earth	50	402	--	Japan 400.
Feldspar, fluorspar, etc	4	350	--	All from Japan.
Fertilizer materials:				
Manufactured:				
Nitrogenous	209,958	314,176	--	U.S.S.R. 225,328; Bulgaria 56,948; South Korea 29,400.
Potassic	44,683	51,211	--	All from U.S.S.R.
Ammonia	3	46	--	Singapore 44.
Gypsum and plasters	50	1	--	All from Thailand.
Lime	9	NA	--	NA.
Mica:				
Crude including splittings and waste	5	NA	--	NA.
Worked including agglomerated splittings	2	12	--	All from Japan.
Pigments, mineral: Iron oxides and hydroxides, processed	14	20	--	Do.
Sodium and potassium compounds:				
Caustic potash	--	17	--	Do.
Caustic soda	86	1,507	--	Belgium-Luxembourg 1,500.
Soda ash	8	NA	--	NA.
Stone, sand and gravel:				
Dimension stone:				
Crude and partly worked	--	20	--	All from Pakistan.
Worked	--	40	--	All from Italy.
Sand excluding metal-bearing	750	2	--	All from Finland.
Sulfuric acid	1	4	--	France 2; United Kingdom 2.
Talc and steatite	50	352	--	All from Japan.
MINERAL FUELS AND RELATED MATERIALS				
Asphalt and bitumen, natural	360	1	--	All from Finland.
Carbon black	350	600	--	All from Japan.
Coal and briquets:				
Anthracite and bituminous coal	61,993	31,302	--	All from Australia.
Lignite including briquets	--	6	--	All from Singapore.
Coke and semicoke	5,000	7,500	--	All from Japan.
Hydrogen, helium, rare gases	--	2	--	Do.

See footnotes at end of table.

Table 16.—Vietnam: Apparent imports of mineral commodities¹—Continued
(Metric tons unless otherwise specified)

Commodity	1979	1980 ^P	Sources, 1980	
			United States	Other (principal)
MINERAL FUELS AND RELATED MATERIALS—Continued				
Petroleum refinery products:				
Gasoline				
thousand 42-gallon barrels	1,056	166	--	All from Italy.
Kerosine	174,965	6,402	--	Singapore 5,766; Thailand 620.
42-gallon barrels	734,124	NA	--	NA.
Distillate fuel oil	170,376	NA	--	NA.
Residual fuel oil	865,333	6 ¹ 134,484	--	Italy 104,804; Hungary 26,908.
Lubricants				
Other:				
Liquefied petroleum gas	10,984	NA	--	NA.
do	15,370	3,880	--	Japan 2,755; Hungary 905.
Mineral jelly and wax	42	NA	--	NA.
Nonlubricating oils	110,637	111,565	--	Japan 79,992; Singapore 31,512.
Bitumen and other residues	667	12	--	All from Belgium-Luxembourg.
do				
Bituminous mixtures	5,491	8,227	--	All from Japan.
Mineral tar and other coal, petroleum, and gas-derived crude chemicals				

^PPreliminary. NA Not available.

¹Owing to a lack of official trade data published by Vietnam, this table should not be taken as a complete presentation of this country's mineral trade. Unless otherwise specified, these data have been compiled from United Nations information and data published by the partner trade countries.

²Less than 1/2 unit.

³Excludes part of Japanese exports valued at \$295,000.

⁴Excludes part of Japanese exports valued at \$102,000.

⁵Excludes Japanese exports valued at \$3,000.

⁶Excludes Japanese exports valued at \$267,000.

In July 1981, the press announced that the first of five 17,000-kilowatt gas turbines had been completed and successfully tested. The plant reportedly was constructed with Soviet technical assistance in only 8 months. Commercial production of power was scheduled to begin in August 1981. Workers were making preparations for the second turbine during the same period.

Successful completion of this powerplant, the first commercial use of domestic hydrocarbons in the country, would reduce the power shortages in the Hanoi area. More importantly, it will encourage a more vigorous petroleum exploration effort on the part of Vietnam, which currently must import all of its petroleum products.

¹By Gordon L. Kinney, physical scientist, Division of Foreign Data.

²Where necessary, values have been converted from Bangladesh takas to U.S. dollars at an average rate of taka16.5=US\$1.00 for 1981.

³Bangladesh Bureau of Statistics, Dacca, Bangladesh. Monthly Statistical Bulletin of Bangladesh. November 1981, p. 178.

⁴Metal Bulletin. No. 6620, September 1981, p. 37.

⁵By John C. Wu, economist, Division of Foreign Data.

⁶Where necessary, values have been converted from Brunei dollars to U.S. dollars at the rate of 2.20 Brunei dollars=US\$1.00.

⁷Far Eastern Economic Review (Hong Kong). Asia 1982 Yearbook. Pp. 8-11, 120-122.

⁸World of Information (Hong Kong). Asia and Pacific. 1981, pp. 139-140.

⁹Standard Chartered Review (London). February 1982, p. 25.

¹⁰Borneo Bulletin (Kuala Belait). Oct. 3, 1981, p. 44.

¹¹By John C. Wu, economist, Division of Foreign Data.

¹²Where necessary, values have been converted from Australian dollars (\$A) to U.S. dollars at the rate of \$A1.11=US\$1.00.

¹³Industrial Minerals (London). No. 169, October 1981, p. 87.

— No. 172, January 1982, p. 50.

¹⁴By John C. Wu, economist, Division of Foreign Data.

¹⁵The real economic growth rates are based on percentage changes in GDP in 1973 constant Hong Kong dollars.

¹⁶Where necessary, values have been converted from Hong Kong dollars (HK\$) to U.S. dollars at the rate of HK\$4.976=US\$1.00 for 1980 and HK\$5.593=US\$1.00.

¹⁷Hong Kong Monthly Digest of Statistics. January 1982, p. 4.

¹⁸Far Eastern Economic Review. V. 115, No. 11, Mar. 12, 1982, p. 72.

¹⁹By Gordon L. Kinney, physical scientist, Division of Foreign Data.

²⁰By E. Chin, physical scientist, Division of Foreign Data.

²¹Far Eastern Economic Review Limited (Hong Kong). Asia 1982 Yearbook. 280 pp.

²²Mining Annual Review (London). Korea (D.P.R.). 1981, p. 442.

²³Richardson, R. Breaking the Shell. Far Eastern Econ. Rev. (Hong Kong), June 1981, pp. 72-74.

²⁴By Gordon L. Kinney, physical scientist, Division of Foreign Data.

²⁵Summary of World Broadcasts FE/W1155/A14 of Oct. 14, 1981, excerpt from KPL in English. 3908 gm, Sept. 28, 1981.

²⁶Vientiane, Laos, SIANG PASASON in Lao. Initial Achievements of the Pa Then Basin Tin Mining Survey. Mar. 6, 1982, p. 2.

²⁷By John C. Wu, economist, Division of Foreign Data.

²⁸Where necessary, values have been converted from Mongolian tugriks to U.S. dollars at the rate of 3.11 tugriks=US\$1.00 for 1978.

²⁹ABECOR Country Report. Mongolian People's Republic. November 1981, a publication of the ABECOR group of banks.

³⁰Far Eastern Economic Review (Hong Kong). Asia 1982 Yearbook. Pp. 8-11.

³¹Montsaine Ulaanbaatar. Oct. 7, 1981 and Dec. 7, 1981.

³²Vernet, D. Mongolia, Buffer or Link. Le Monde (Paris), Aug. 28, 1981, p. 5.

³³Metal Bulletin (London). No. 6656, Jan. 19, 1982, p. 13.

³⁴American Metal Market. V. 90, No. 4, Jan. 7, 1982, pp. 1, 9.

³⁵The British Sulphur Corp., Ltd. (London). Phosphorus and Potassium. No. 118, March-April 1982, p. 15.

³⁶By Gordon L. Kinney, physical scientist, Division of Foreign Data.

³²Where necessary, values have been converted from Nepal rupees (NPs) to U.S. dollars at the rate of NPs12.00 = US\$1.00.

³³Nepal fiscal year runs from mid-July to mid-July.

³⁴U.S. Department of State, American Embassy, Kathmandu, Nepal. Foreign Economic Trends and Their Implications for the United States. November 1981, p. 6.

³⁵By John C. Wu, economist, Division of Foreign Data.

³⁶Monthly Digest of Statistics. Department of Statistics, Singapore. V. 21, No. 3, March 1982, and all other values have been converted from Singapore dollars (S\$) to U.S. dollars at the rate of S\$2.1127 = US\$1.00 for 1981.

³⁷Metal Bulletin (London). No. 6676, Mar. 20, 1982, p. 23.

³⁸U.S. Embassy, Singapore. State Department Airgram A-20, Apr. 15, 1982, pp. 3-5.

³⁹By Gordon L. Kinney, physical scientist, Division of Foreign Data.

⁴⁰Petroleum News (Hong Kong). V. 12, No. 10, January 1982, p. 41.

⁴¹Oil and Gas Journal. V. 80, No. 3, Jan. 18, 1982, p. 64.

⁴²By Gordon L. Kinney, physical scientist, Division of Foreign Data.

⁴³Far Eastern Economic Review. 1982 Annual Yearbook. P. 263.

