The Mineral Industry of Burma

By Gordon L. Kinney[1]

The gross domestic product (GDP) of Burma for 1977[2] was estimated at just over $4.0 billion[3] at current prices. Revised GDP figures for 1975-76 were $3,510 million for 1975 and $3,996 million for 1976. The GDP at constant 1969 prices was $1,839 million in 1976 and estimated at $1,842 million in 1977. One encouraging sign was the taming of the chronically high inflation rate. The revised Rangoon consumer price index (1972=100) increased about 14% during the year to 256, a smaller increase than in previous years. The balance-of-payments deficit was again held to a very manageable level—$29 million (revised) in 1976 and $22 million in 1977. Exports totaled an estimated $240 million, and imports increased to an estimated $312 million during 1977.

The latest figures show that the population increased 2.2% in 1977 to 31.5 million. The total active labor force was 12.4 million, with 66,000, or 0.53%, engaged in mining activities. These miners produced about 1.7% of the net 1977 output of goods and services.

The value of the output of the mineral sector for 1976 was $69 million at current prices, a 31% increase over the 1975 figure.[4] Value figures for 1977 were not available but will probably be between the 1975 and 1976 levels at constant prices and could show a modest increase at current prices.

The overall physical output of mineral products during 1977 was only slightly greater than in 1976, but the long-term trend is one of gradual decline, primarily owing to lack of new investment and failure to bring any significant new mines into production. Although its current output is small, Burma was a mineral producer of some consequence before World War II and still is considered to have a good potential for expansion. At present, however, no foreign investment is allowed in mining. All important mining operations are conducted by the Government-owned mining corporations. Foreign participation has been limited to technical assistance and financial aid. Small-scale, family-operated mines are still privately owned, with most of the output being sold to the Government.

The major aim of the Government's mining policy at present is to modernize or reopen existing mines that were in production before World War II but are now operating at reduced production levels or have closed because of deteriorated equipment and/or a lack of investment capital.

Despite Burma's favorable mineral potential, many of the most promising areas for exploration have not been mapped or prospected in any detail because of security problems.

One bright note in the mineral industry was the continued growth of the small petroleum sector during the year. The Government continued its program to upgrade the petroleum transportation system, and these improvements were instrumental in allowing a substantial increase in domestic crude oil production. In the past few years, refinery output has been restricted mainly by outmoded transport facilities rather than by a lack of crude oil at the oilfields. The Government continued its firm policy against petroleum imports, and shortages were encountered again but to a much lesser extent than in 1976. The refineries operated essentially at capacity during 1977, and the fuel shortages are expected to continue until completion of the new Japanese-financed refinery in 1981. Fourteen new development wells were sunk at existing fields during 1977. The use of im-

proved secondary recovery techniques and these new wells contributed to the production increase in 1977. Production should continue to climb during 1978 as the full impact of the new wells, techniques, and transport improvements is felt.

PRODUCTION

Burma's total 1977 mineral output increased slightly over that of 1976. Although gains were registered in some minerals, the overall picture was one of declining output when viewed against average production figures of the past 5 years. Only coal, antimony ore, and tungsten concentrates reflect a rising trend. For all other metallic ores, on which data are available, the output trend has been declining.

Industrial minerals again had a mixed year; feldspar, gypsum, and dolomite showed sizable drops in production, and barite, yellow ocher, and limestone recorded substantial increases.

Crude oil production rose for the fourth straight year, showing a 28% increase over that of 1976. Natural gas production, which has nearly doubled since 1974, continued climbing steadily.

The value of the production of individual minerals for 1977 was not available from official sources, making comparisons and conclusions difficult and often subject to later change. A Burmese Government report[5] stated that the value of overall mineral production for 1976 (provisional) at constant 1969 prices increased 31%. The 1977 increase, however, may be significantly less.

Table 1.—Burma: Production of mineral commodities

(Metric tons unless otherwise specified)

Commodity[1]	1975	1976	1977[p]
METALS			
Antimony, mine output, metal content	274	468	500
Copper:			
Mine output, metal content[e]	[r]86	[r]92	45
Matte, gross weight	191	205	99
Iron and steel:			
Crude steel[e]	[r]36,000	40,000	40,000
Semimanufactures	[e]35,000	NA	NA
Lead:			
Mine output, metal content[e]	[r]9,800	[r]7,100	8,900
Smelter:			
Refined lead	[r]2,751	3,331	4,832
Antimonial lead (18%-20% antimony)	251	187	120
Nickel:			
Mine output, metal content[e]	19	24	17
Speiss, gross weight	77	94	69
Silver, mine output thousand troy ounces	775	211	233
Tin, mine output:			
Metal content of tin concentrate	[r]274	264	114
Metal content of tin-tungsten concentrate	[r]256	243	248
Total	[r]530	507	362
Tungsten, mine output:			
Metal content of tungsten concentrate	[r]155	109	108
Metal concentrate of tin-tungsten concentrate	[r]175	167	170
Metal content of tin-tungsten-scheelite concentrate	[r]165	192	168
Total	[r]495	468	446
Zinc, mine output, metal content	[r]2,647	2,211	1,834
NONMETALS			
Barite[2]	[r]25,720	15,681	17,273
Cement, hydraulic thousand tons	[r]184	233	269
Clays:[2]			
Ball clay	4,296	5,762	4,674
Bentonite	915	955	975
Fire clay[3]	3,617	2,792	4,627
Industrial white clay	2,489	4,393	3,449
Feldspar[2]	[r]810	1,709	1,422
Graphite[2]	(4)	161	96
Gypsum[2]	39,260	45,296	33,511

See footnotes at end of table.

Table 1.—Burma: Production of mineral commodities —Continued

(Metric tons unless otherwise specified)

Commodity[1]	1975	1976	1977[p]
NONMETALS —Continued			
Precious and semiprecious stones:[2]			
Jadeite ---- kilograms	[r]3,949	31,387	6,532
Unspecified ---- thousand carats	76	NA	NA
Salt ---- thousand tons	[r]98	123	188
Sand:[2]			
Glass sand, brown	5,283	NA	NA
Glass sand, white	[r]2,711	NA	NA
Stone:[2]			
Dolomite	887	1,408	366
Limestone, crushed and broken ---- thousand tons	[r]602	645	1,159
Quartz	386	116	73
Talc and related materials, soapstone[2]	[r]421	238	201
MINERAL FUELS AND RELATED MATERIALS			
Coal	24,588	20,931	23,926
Gas, natural:			
Gross production ---- million cubic feet	--	--	--
Marketed production[2] ---- do	[r]7,656	8,183	10,200
Petroleum:			
Crude ---- thousand 42-gallon barrels	6,700	8,183	10,400
Refinery products:			
Gasoline ---- do	1,506	1,645	1,739
Jet fuel ---- do	166	[e]188	217
Kerosine ---- do	1,440	1,117	1,630
Distillate fuel oil ---- do	1,463	2,045	2,145
Residual fuel and losses ---- do	1,489	[e]2,002	1,427
Lubricants ---- do	[r]185	[e]163	189
Other ---- do	[r]434	[e]556	722
Refinery fuel and losses ---- do	307	[e]461	583
Total ---- do	6,990	8,177	8,652

[e]Estimate. [p]Preliminary. [r]Revised. NA Not available.

[1]In addition to the commodities listed, Burma also produces pottery clay, common sand and gravel, other varities of crude construction stone, and other varities of gem stones, but available information is inadequate to make reliable estimates of output levels.

[2]Data are for fiscal year beginning Apr. 1 of that stated.

[3]Includes fire clay powder.

[4]Revised to none.

TRADE

The mining industry usually ranks third, after agriculture and forestry products, in value of exports. Exact figures are not available at this writing, but the relative importance of the mining sector is not believed to have changed in 1977. Foreign exchange revenue for minerals constituted about 7% of Burma's total receipts. Burma normally exports all of its mineral output, particularly in the metallic sector. Most ores are exported in unprocessed form because there are no substantial smelting or refining facilities in the country except the old lead and zinc smelter associated with the Bawdwin mining operation.

Table 2.—Burma: Exports and reexports of mineral commodities[1]

(Metric tons unless otherwise specified)

Commodity	1976	Principal destinations, 1976
METALS		
Antimony ore and concentrate	485	Singapore 362; United Kingdom 82.
Iron and steel, semimanufactures ___ value	$3,489	All to United Kingdom.
Lead, metal, unwrought, refined	1,622	U.S.S.R. 769; Hong Kong 735.
Silver, unwrought ___ thousand troy ounces	174	All to United Kingdom.
Tin ore and concentrate	484	Malaysia 279; United Kingdom 114; Netherlands 46.
Tungsten ore and concentrate	418	West Germany 330; United States 53.
Zinc ore and concentrate	2,047	Belgium-Luxembourg 1,228; West Germany 818.
NONMETALS		
Cement	19,996	Nigeria 17,654; Saudi Arabia 2,342.
Clays:		
Clay, unspecified ___ value	$97	NA.
Fuller's earth ___ do	$18	NA.
Fertilizer materials:		
Nitrogenous	2,679	All to Malaysia.
Unspecified	2,545	Indonesia 1,652; Malaysia 893.
Gem stones, excluding diamond:		
Jade:		
Uncut ___ thousand troy ounces	141	Mainly to Hong Kong.
Cut but not set ___ thousand carats	200	Hong Kong 127; United States 36; Netherlands 20.
Ruby ___ do	11	Hong Kong 7; Singapore 2; Sweden 1.
Sapphire ___ carats	1,240	Hong Kong 1,148.
Unspecified ___ do	1,237	East Germany 1,231.
Limestone, flux ___ value	$125	All to United Kingdom.
Stone, dimension, calcareous ___ do	$268	All to Hong Kong.
MINERAL FUELS AND RELATED MATERIALS		
Petroleum refinery products:		
Distillate fuel oil ___ thousand 42-gallon barrels	727	NA.
Residual fuel oil ___ do	6,611	India 875.
Lubricants ___ do	7	NA.
Mineral jelly and wax ___ do	[2]205	Singapore 88; East Africa 70; Italy 42.
Other:		
Petroleum coke ___ do	34,570	All to Japan.
Bitumen and other residues ___ do	6	NA.
Total ___ do	42,126	

NA Not available.
[1]Data for 1975 not available.
[2]Total excludes quantity valued at $274.

Table 3.—Burma: Imports of mineral commodities[1]

(Metric tons unless otherwise specified)

Commodity	1974	1975	Principal sources, 1975
METALS			
Aluminum:			
Oxide and hydroxide	2	(2)	
Metal including alloys:			
Unwrought	227	864	Mainly from France.
Semimanufactures	321	367	Hong Kong 215; U.S.S.R. 120.
Chromium oxide and hydroxide	(2)	1	All from Japan.
Copper:			
Ore and concentrate	4	--	
Copper sulfate	2	1	Mainly from United Kingdom.
Metal including alloys:			
Unwrought	7	107	All from United Kingdom.
Semimanufactures	230	184	Japan 79; West Germany 71.
Iron and steel metal, including alloys:			
Pig iron, including cast iron	1,548	15,507	North Korea 10,602; South Korea 3,037.
Steel, primary forms	2,965	28,838	South Korea 16,272; Japan 12,566.
Semimanufactures	31,294	75,983	NA.
Lead metal including alloys, all forms	16	2	Mainly from Japan.
Manganese oxide	182	166	Mainly from Japan.
Mercury ___ 76-pound flasks	94	10,041	Mainly from West Germany.
Nickel metal including alloys, all forms	31	3	Mainly from United Kingdom.
Tin metal including alloys, unwrought and semimanufactures	150	254	Mainly from Japan.
Titanium oxide	36	33	Mainly from West Germany.

See footnotes at end of table.

Table 3.—Burma: Imports of mineral commodities[1] —Continued

(Metric tons unless otherwise specified)

Commodity	1974	1975	Principal sources, 1975
METALS —Continued			
Zinc:			
Oxide	68	43	People's Republic of China 20; United Kingdom 12.
Metal including alloys, all forms	308	536	Mainly from Japan.
Other:			
Ores and concentrates, n.e.s	1	--	
Oxides, hydroxides, peroxides of metals, n.e.s	201	7	Mainly from Japan.
Base metals including alloys, all forms	(2)	(2)	
NONMETALS			
Abrasives, natural, n.e.s. value, thousands	$69	$49	NA.
Asbestos	150	410	Mainly from South Africa.
Boric acid	--	4	Mainly from United Kingdom.
Bromine	--	(2)	
Cement	699	418,908	Mainly from West Germany.
Chalk	136	4	United Kingdom 2; United States 2.
Clays and clay products:			
Crude:			
Kaolin (china clay)	8	3	All from Japan.
Other	58	27	Sweden 14; India 10.
Products:			
Refractory value, thousands	$325	$23	Mainly from Austria.
Nonrefractory do	$92	$31	Mainly from People's Republic of China.
Fertilizer materials:			
Manufactured: Phosphatic	7,497	84	All from Israel.
Ammonia	20	23	Mainly from United Kingdom.
Graphite, natural	(2)	(2)	
Gypsum value, thousands	(2)	--	
Iodine	1	(2)	
Mica, all forms	1	(2)	
Precious and semiprecious stones, except diamond carats	--	65,749	NA.
Salt	408	34	Mainly from United Kingdom.
Sodium and potassium compounds, n.e.s.:			
Caustic soda	5,400	3,001	United States 1,441; West Germany 1,294.
Caustic potash, sodic and potassic peroxides	4	6	Mainly from France.
Stone, sand and gravel: Quartz and quartzite	46	10	All from United Kingdom.
Sulfur:			
Elemental	832	121	All from West Germany.
Sulfuric acid	1	17	Japan 12; United Kingdom 4.
Other nonmetals, crude	1	NA	
MINERAL FUELS AND RELATED MATERIALS			
Carbon black	113	156	Japan 109; United Kingdom 29.
Coal and briquets: Anthracite and bituminous	151,842	232,153	India 131,532; People's Republic of China 58,663.
Coke and semicoke	NA	9,107	India 6,649; West Germany 2,456.
Hydrogen, helium, rare gases	1	--	
Petroleum:			
Crude thousand 42-gallon barrels	1,486	--	
Refinery products:			
Kerosine and jet fuel do	(2)	--	
Residual fuel oil do	16	(2)	
Lubricants do	20	15	NA.
Other:			
Mineral jelly and wax do	(2)	(2)	
Nonlubricating oils do	25	--	
Petroleum asphalt and pitch do	49	22	Mainly from Japan.
Mineral tar and other coal-, petroleum-, or gas-derived crude chemicals	266	--	

NA Not available.

[1]Imports for consumption only, does not include imports into bond. Data for 1976 not available.

[2]Less than 1/2 unit.

COMMODITY REVIEW

METALS

Antimony.—Production continued to climb; antimony being one of the few minerals to show a sustained growth pattern over the last few years. Production has increased an average of 17% per year since 1973. Growth could continue for many years as geologic exploration programs underway outline the actual reserves available. At present, most antimony mines are small-scale, labor-intensive operations at rich surface outcroppings. Antimony ore is sold by individual miners to the Government's Mineral Development Corp.

Copper.—Delineation drilling of the Monywa copper deposits continued under United Nations Development Program (UNDP) auspices during 1977. No additional reserves data were released. The previously reported figures of over 60 million tons of 0.7%+ copper ore indicated that an open pit mine and processing facilities would be feasible, but little development work was underway at yearend. Apparently, the reported pilot plant was not yet operating at the deposits. The proposed West German and additional Japanese bilateral assistance for the project did not materialize. There were reports of possible Yugoslav assistance, but no details were available. This copper ore site has the attraction of being located in a secure zone and being close to the rail and river transportation system. The Government was reportedly anxious for its development to begin.[6] The plans call for an 8,000-ton-per-day mill and mining operation and a 20,000-ton-per-year smelter.

Lead and Zinc.—Production of lead and zinc concentrate increased 37% and 34%, respectively, over the 1976 figures. However, tonnages produced in 1977 were still well behind the average for the previous 5-year averages. The Ministry of Planning and Finance Report to the Legislature[7] indicated that lead and zinc exploration drilling was conducted during the year, apparently at an increased level, but no results were published. Most of the lead and zinc production continued to come from the famed Bawdwin mine in Northern Shan State, which was once one of the richest lead deposits in the world. Today production is hindered by declining ore grade and the deteriorating mine and plant facilities, and although several plans to modernize the mining and smelting complex with foreign assistance have been advanced, little investment has actually been made. The West German Government extended a 6-million-Deutsche-mark (DM) loan for equipment modernization. The major deterrent to large-scale investment is the location of the mine in an area that is increasingly threatened by armed insurgent forces. The situation also prevents further exploration of nearby areas believed to have additional rich deposits. As yet, work has not started on the new West German-financed DM50-million zinc smelter to be constructed at Pyinmana 19°44' N, 96°13' E near Eala 19°37' N, 96°13' E. This would be fed mainly from the Bawdwin mine's slag and tailings piles. For many years, the zinc content was not exploited, and the waste piles have been accumulating since 1905.

Tin and Tungsten.—Production of tin and tungsten concentrates increased considerably during 1977 after a rather poor showing in 1976. Although output returned to the level of the past 5-year average, it was still only about 10% of the pre-World War II level.[8] The potentially rich deposits along the Tennassarim coast continued to be underexploited owing to a lack of capital investment, the presence of armed insurgents, and a lack of firm Government control in the area. At present, about 75% of production comes from small-scale private mining operations which sell their production to the State. The unstable conditions permit considerable illicit tin and tungsten mining, with the output often being smuggled out of Burma through Thailand and Malaysia. Since 1975, a United Nations sponsored offshore tin exploration survey has been underway along the Tennassarim coast. Recently, a sophisticated ore-sampling drill was brought in from Singapore on a specially constructed barge. It was reported that the potential offshore mining was less likely to encounter security problems.

Modernization of the old Heinda Mine, being done with West German aid, was completed in March 1977, and the mine was reported to be operating at yearend with West German technical advisers on the scene. The mine was designed to produce about 1,000 tons of tin concentrate per year. Exploration work was underway at the nearby Hermyingy underground mine, but no significant ore production was reported.

In March 1977, the World Bank's International Development Association approved a $16 million loan to cover foreign exchange costs of developing the tin and tungsten alluvial deposits in the Heinze Basin, 280 kilometers southeast of Rangoon. Work is to include a new dredge and related facilities and a new tin and tungsten concentrating

plant at Tavoy (14°05' N, 98°12' E). Work on the project was underway at yearend. Proved ore reserves were reported to be 32 million cubic meters of sand containing about 5,000 tons of tin.

NONMETALS

There was little new development in the industrial minerals sector in 1977. Limestone, barite, and some types of clays production increased, while feldspar declined. Limestone production rose 80% to over 1 million tons. Most of this was consumed in the manufacture of 269,000 tons of portland cement. This was the second consecutive significant annual increase in cement production. First-quarter-1977 statistics indicated a significant upward trend in brick and tile production also. A Chinese source[9] reported completion of a Kyangin cement plant, but other details were not available.

Negotiations were successfully completed in January 1977 with Asahi Glass Co. Ltd., of Japan for a sheet glass plant and production technology. The plant will be located in Bassein (16°47' N, 94°44' E) and will use locally obtained glass sands. Reported capacity of the plant will be 12,000 tons per year. The existing Syriam glassware factory planned to increase its present output by replacing two old 25-ton-per-day furnaces with two new furnaces capable of producing 50 tons per day.

MINERAL FUELS

Coal.—Burma continued to have a fuel shortage during the year. The country has few known deposits of coal, and little information was available on any plans to increase the presently trivial coal production. The main producers were still believed to be the Kalewa and Nama coal mines. Production increased in 1977 to over 23,000 tons, continuing the slow but steady increase of the last few years. There were no available data on 1977 coal imports.

Petroleum and Natural Gas.—Petroleum production was the bright spot in Burma's mineral industry. Approximately 10.4 million barrels of crude oil was produced during the year, a 27% increase over the 8.2 million barrels (revised) reported for 1976. That level of production was just about the limit of the refining capacity of Burma's two small refineries, and corresponded in tonnage to about 2% of Indonesia's oil output. Demand, however, continued to climb along with production. The Burmese Government continued its policy of no petroleum imports, and shortages continued to plague the industry, albeit on a much reduced scale for 1977. The well count and crude oil production in U.S. barrels by field for 1977, together with the 1975 and 1976 totals, are summarized in the following tabulation:

Field	Number of wells				Average yearend production (42-gallon barrels per day)
	Flowing	Pumping	Gas-lift	Total	
Mann	96	6	--	102	20,400
Yenanguang	3	151	4	158	3,600
Myanaung	13	34	4	51	2,950
Chauk	4	97	--	101	1,300
Prome	16	15	--	31	1,300
Letpando	4	--	--	4	800
Total	136	303	8	447	30,350
1976	115	261	8	379	24,994
1975	105	361	--	466	16,559

Natural gas production was 9.6 billion cubic feet (272 million cubic meters) in 1977 versus 8.5 billion cubic feet (241 million cubic meters) in 1976. Output was used in industry and in gas turbine electricity generating plants.

There was no offshore exploration activity in Burma in 1977. The four foreign operators that signed service contracts in 1974—Esso Co.; Martaban-Cities Service, Ind.; Japanese Arakan Oil Development Corp., and France's CFP (Total)—all let their offshore licenses expire following unsuccessful drilling through October 1976 within their respective concessions. Of the 17 holes drilled offshore by the four companies, none yielded commercial quantities of oil and 1 produced a small amount of natural gas. The anticipated reopening of bidding for new concessions did not take place during 1977 but may occur in the near future.

Onshore exploration and development have been exclusively by the Government's

Myanma Oil Corp. (MOC), with no foreign firms being invited to participate. MOC conducted somewhat less exploration activity in 1977 than in previous years. The major areas of interest were the upper Chindwin Basin and the Irrawaddy Delta. A number of test wells were drilled in these areas and also in the area between Prome and the Mann oilfield. There were no reports of significant finds in 1977.

Twenty-four new development wells were sunk at existing fields during the year. Of these, 17 were at Mann oilfield, 4 at Letpando, and 3 at Yenangyaung. These new development wells and improved secondary recovery techniques accounted for the year's production increases.

In the refining sector, contracts for construction of the new 25,000-barrel-per-day refinery at the Mann oilfield were finally signed in December 1977. The signing came nearly a year after the announcement of the loan agreement between the Japan Overseas Economic Cooperation Fund and the Burmese Government. Japan's Mitsubishi Heavy Industries Ltd. will be the major contractor for the full turnkey contract, which is to be completed in 1981. The objective of the plant is to supplement Burma's needs for petroleum products and to produce raw materials for synthetic fibers and petrochemicals. The range of products will be motor fuels through JP-5. The cost, reported at Japanese yen at 29.95 billion, equates to well over $100 million depending on the exchange rate used. The remote location of the refinery in central Burma added considerably to the cost. The increased refining capacity will meet Burma's projected petroleum products needs for several years.

The crude oil transportation bottlenecks encountered in the last few years have received priority attention by the Government, and the overall situation was greatly improved by yearend 1977. The most important development was the completion of the 218-kilometer-long, 25.4-centimeters-in-diameter pipeline from the Mann oilfield to the Gwema loading point at Prome. In addition, work was begun in 1977 on a project to extend the Mann pipeline the remaining 280 kilometers directly into the Syriam refinery near Rangoon. The line is being financed by a loan from the Chase Manhattan Bank and should be finished by early 1979. Completion of the line will eliminate the slow and costly river barge transport presently used to deliver most of the crude oil to the refinery.

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[1]Physical scientist, Branch of Foreign Data.

[2]All data given for the Burmese fiscal year, which is the year beginning Apr. 1 of that stated.

[3]Where necessary, values have been converted from Burmese kyats (K) to U.S. dollars at the rate of K6.7=US$1.00. Toward yearend the exchange rate was K7.2448=US$1.00.

[4]Ministry of Planning and Finance Report to the Pyithu Hluttaw on the Financial, Economic, and Social Conditions of the Socialist Republic of the Union of Burma for 1977-78. 1977, pp. 13-15.

[5]Page 75 of work cited in footnote 4.

[6]U.S. Embassy, Rangoon, Burma. Industrial Outlook Report: Minerals. State Department Airgram A-045, May 19, 1978, pp. 1-5.

[7]Page 81 of work cited in footnote 6.

[8]Work cited in footnote 6.

[9]New China News Agency (Peking). 1531 GMT, Apr. 1, 1978.