

THE AUSTRALIAN MINERAL INDUSTRY

PART 1 — QUARTERLY REVIEW

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THE AUSTRALIAN MINERAL INDUSTRY

VOL. 14, No. 3

PART 1 — QUARTERLY REVIEW

MARCH, 1962

Prepared in the MINERAL ECONOMICS SECTION

Chief Mineral Economist — J. W. MORGAN

Issued under the authority of
SENATOR the HON. W. H. SPOONER
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Information of interest to the mineral industry, corrections to published data, and suggestions will be welcomed.

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* Including graph of 1961 prices.

AUSTRALIAN MINERAL INDUSTRY

QUARTERLY REVIEW

MARCH, 1962

THE MINERAL INDUSTRY OF TASMANIA

By D. F. Livingstone

The mineral industry makes an important contribution to the economy of Tasmania. Much of the State's development has been and will continue to be bound up with mineral discovery and production. The development of hydro-electric power has also made Tasmania an attractive location for primary metal treatment and has resulted in the establishment of three major refineries and, recently, a ferro-alloy plant.

Tasmania's importance as a mineral producer lies largely in the field of non-ferrous base metals. In 1960 — the latest year for which complete statistics are available* — Tasmania was, after Queensland, the second producer of tin among the Australian States, second to Queensland as a producer of copper and to New South Wales as a producer of zinc, and third after New South Wales and Queensland as a producer of lead. Tasmania also is almost the sole producer of tungsten in Australia, the leading producer of pyrite and the second producer of cadmium, and has in recent years consistently produced over a million and a quarter ounces of silver and 20,000 ounces of gold annually.

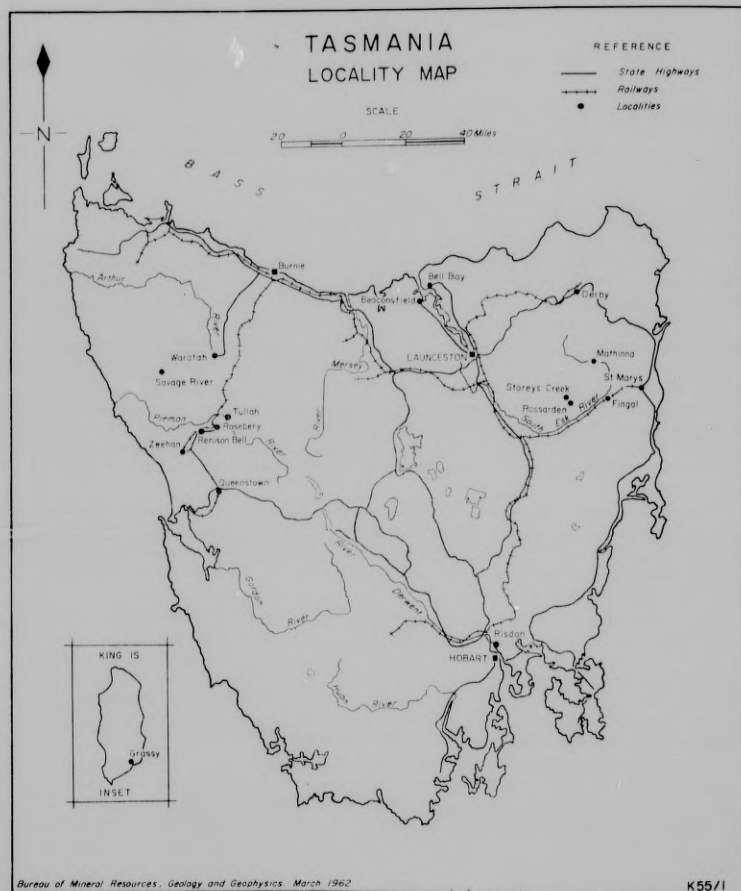
Metal treatment plants within the State produce the whole of Australia's domestic primary aluminium, the bulk of domestic refined zinc and cadmium, and a significant tonnage of refined copper. In addition Tasmanian enterprises produce titanium dioxide pigments, the whole of domestic calcium carbide, and a substantial tonnage of fertilizers, including half of the domestic production of ammonium sulphate.

The value of mine output arrived at from census returns for 1960 shows that per capita output in Tasmania was £22.7, compared with an Australian per capita output of £17.4. Taking into account estimates of the added market value arising from further domestic primary treatment — i.e., smelting and refining — Tasmania's contribution to the total output of the Australian mineral industry in 1960 (excluding aluminium and titanium dioxide) was about £17.5 million, representing a per capita output of £47.8, compared with the Australian average of £22.7 per capita.

Against this background of its significant contribution to the Australian mineral industry as a whole, the mineral industry of Tasmania is pressing ahead with development of existing mines and plants and exploration for new deposits, particularly of base metals. Interesting developments may also be expected in the field of industrial minerals, in the manufacture of ferro-alloys and possibly in exploitation of iron ore deposits.

The principal mining regions of the State are the west coast, southwards from the Arthur River, and the north-east, bounded on the south and west by the South Esk River. The former includes the mining centres of Waratah, Rosebery, Zeehan and

* Statistics throughout this article are as collected by the Bureau of Mineral Resources or the Commonwealth Bureau of Census & Statistics. These may not agree in some instances with figures published by the State Mines Department, owing to a different basis of collection, but are chosen as offering the best means of comparison on an Australia-wide basis, where required.



Queenstown, and produces copper, lead, zinc and tin, with associated gold, silver and pyrite, and has also produced osmiridium and nickel. The latter includes the centres of Rossarden, Storey's Creek, Fingal, St. Mary's, Derby and Beaconsfield, and produces tin, tungsten and coal, with a little gold.

Although alluvial gold was discovered at Mathinna about 1855, and coal deposits were known about the same period, the first major event in the mineral history of Tasmania was the discovery of the great Mount Bischoff tin deposits in 1871. With Waratah as a base, prospectors worked their way southwards and westwards through most inhospitable country, and numerous discoveries followed before the end of the century. Silver-lead was discovered at Magnet in 1877 and Zeehan in 1882. Tin was discovered near Mt. Heemskirk in 1879 and at Renison Bell in 1890. The copper deposits of Mt. Lyell were first worked for gold in 1885 and recognised as cupriforous ore in 1891. The Read-Rosebery lead-zinc deposits were discovered over the period 1891-94.

In the north-east of Tasmania also the majority of mineral discoveries were made in the late 19th century, although the most important present producer dates from some time later. Gold was discovered at Mathinna in 1855, but production was short-lived, reviving however in 1887; gold was also discovered at Beaconsfield in 1877. Tin was discovered in the Blue Tier-Ringarooma district in 1874, and in association with wolfram at Storey's Creek in the 1880's; the present major Tasmanian tin producer, Aberfoyle, was discovered in 1916. Scheelite was discovered on King Island in 1904.

There was no major mineral discovery in Tasmania after Aberfoyle in 1916 until the re-discovery of the Savage River iron ore deposits in 1956-57. Discoveries of uranium mineralisation in the north-east in 1955 and 1956 proved of only minor importance. Thus the mining industry at present is based almost entirely on deposits which have been known and worked for many years. It is vital, therefore, that exploration for new deposits and metallurgical research to improve recovery at existing mines should be successful.

Table 1 shows some details of the output of the mineral industry in Tasmania in recent years. The most important single product is copper, followed by lead, zinc, tin and tungsten.

Table 2 shows some details of production from primary mineral treatment, whether of indigenous raw material or not; it includes some commodities which may be regarded as primary commodities in so far as they represent the first basic forms in which the minerals from which they are derived can be absorbed by the appropriate sectors of secondary industry.

Copper. The principal copper producer in Tasmania is Mount Lyell Mining & Railway Company Ltd., operating at Queenstown on the west coast. The present annual output is 11,000 tons of refined copper, 6,500 ounces of gold, 37,000 ounces of silver and 70,000 tons of pyrite; this requires the mining of 2,000,000 tons of ore annually, with a similar tonnage of overburden. From the commencement of operations in 1894 up to 30th June, 1961, the company produced 534,000 tons of copper, 574,000 ounces of gold, 16.7 million ounces of silver and 786,000 tons of sulphur in pyrite. Reserves as of August, 1961, were 25,500,000 tons at 0.79% copper.

A feature of Mount Lyell's operations is that its output has been achieved on an overall ore grade of less than 1.5% copper, taking into account comparatively rich ore-bodies such as North Lyell (5.46% Cu) and Lyell Comstock (2.36% Cu) which have been worked over the years. The present operating grade in the West Lyell open cut, the main producing area, is 0.70% copper, making this one of the lowest-grade copper deposits currently being mined anywhere in the world.

At the present rate of production the life of the mine based on the reserves quoted above is 12 years, by which time the open cut, at present 400 feet deep (actually 600 feet from the original hill surface) will be about 800 feet deep, a mile long and half a mile wide. This depth is considered to be the practicable limit of open-cutting. The future of the mine beyond this point depends on whether or not a successful method of underground mining can be developed. Although the orebodies in the West Lyell open cut are low-grade, there is evidence that they do not depreciate in grade at depth, so that the ore to be won underground might run about 1% copper. Methods of mining ore of this grade are at present being investigated.

The possibility of orebodies of higher grade being discovered in the Mount Lyell field should not be overlooked. Experience has shown, however, that such bodies tend to be erratic in grade. While such discoveries would, of course, improve the overall position, the basic problem to be met is, therefore, underground mining of low-grade ore. The history of the Mount Lyell Company gives every reason to believe that this problem will be attacked with considerable resolution.

The only other production of copper in Tasmania at present is by Electrolytic Zinc Company of Australasia Ltd. at Rosebery on the west coast. A lead-copper concentrate assaying 30-40% lead and 8-9% copper, together with some gold and silver, is produced and exported; this "copper concentrate" (which is actually sold as "lead grade 2 concentrate") amounts to about 7,000 tons per year.

Lead and Zinc. The principal lead-zinc mine in Tasmania is the Rosebery mine of Electrolytic Zinc Company of Australasia Ltd. Ore from the company's Hercules mine at Mt. Read, 5 miles distant, is also treated at the Rosebery mill; the present proportion of Rosebery ore to Hercules ore in the mill feed is 10 : 1.

The present output of the Rosebery mill consists of zinc concentrates (assaying 55% zinc), lead concentrates (assaying 58% lead) and lead-copper concentrates (assaying 30-40% lead and 8-9% copper, and carrying two-thirds of the recoverable gold and silver). Annual production in terms of metal content, from 200,000 tons of ore mined and treated, is about 32,000 tons of zinc, 9,000 tons of lead, 600 tons of copper, 1.2 million ounces of silver and 16,500 ounces of gold. Zinc concentrates are shipped to the company's refinery at Risdon; other concentrates are exported. Between February, 1936, and June, 1961, total production was 1,251,000 tons of zinc concentrates and 353,000 tons of lead and lead-copper concentrates. Published ore reserves as of 30th June, 1961, were 3,500,000 tons for the two mines, of which the Hercules mine accounted for about 300,000 tons. The grade in the two mines is the same—18.5% zinc, 5.5% lead and 0.5% copper, with 6.2 oz. silver per ton and 2 dwt. gold per ton—and the mill feed is thus proportional to the respective reserves. Successful drilling and development over recent years has resulted in a steady increase in reserves, and it is reasonable to assume that these reserves will be maintained for some time to come; ore production is thus assured for a substantial period, and mill developments now in hand may enable the recent gradual rise in output of concentrates to be maintained.

The Mt. Farrell mine at Tullah, some seven miles north of Rosebery, is the only other lead producer of any size in Tasmania. In 1960 this mine produced 645 tons of lead in concentrates. The Oceana mine, which had been the second largest producer for some time, producing about 2,500 tons of lead annually, closed in July, 1960, when reserves were exhausted. This was the last mine of any consequence to operate on the once-famous Zeehan field, which is estimated to have produced more than £5,000,000 worth of minerals before World War I.

Tin. Aberfoyle Tin N.L., operating at Rossarden in north-east Tasmania, is the major tin producer in the State. The present annual output is about 800 tons of tin concentrates containing 600 tons of tin; about 400 tons of wolfram concentrates are also produced annually; the bulk of the tin concentrates is sold to domestic smelters, and the wolfram concentrates are exported. Reserves as of 30th June, 1961, were 300,000 tons of ore; the actual grade in ore veins is 2.5% tin, but dilution with mullock lowers the grade as mined to 0.8% tin; there is thus approximately 5 years ore in sight, and this position is being maintained by drilling and development.

In recent years the Aberfoyle mine has been the leading producer of tin in Australia, and this position should be further improved by the installation of a heavy media separation plant which is expected to commence operation towards the end of 1962. This will reduce the load on the primary crushing circuit and permit of increased tin recovery and lowered costs; it will also be possible to treat the tailings dump which was estimated to contain £400,000 worth of recoverable tin as of mid-1961. The application of mechanisation in stopes and the introduction of hydraulic fill, now being investigated, should also improve recovery.

The second largest tin producer in Tasmania is the Renison Bell mine on the west coast. Annual production of tin in concentrates is of the order of 100 tons; in the year ended 30th June, 1961, production was 193 tons of concentrates containing 128 tons of tin. Reserves at that time were 216,000 tons at 1.23% tin; indicated reserves on the leases were estimated at 1,500,000 tons at 0.6% tin.

The present most important feature of the Renison Bell mine, however, is not its status as a producer, but the nature of the ore, which presents metallurgical problems solution of which might effect a substantial improvement in the tin position in Australia. Tin occurs as fine-grained cassiterite in intimate association with pyrrhotite, arsenopyrite and pyrite. The necessity for floating off sulphides and the fine grain size of the cassiterite have resulted in only 50 percent recovery; it is hoped that recent modifications to the mill by the substitution of vanners for tables will raise this to about 60-65 per cent, but investigations are continuing into other mechanical and chemical means of improving recovery. If recovery of cassiterite from this type of ore is improved, this will not only result in higher production from Renison Bell, but will render more attractive other cassiterite-pyrrhotite orebodies now being tested on the west coast.

Other smaller tin producers are the Dorset Dredge, operated by Storey's Creek Tin Mining Company N.L. at South Mt. Cameron (production of tin in concentrates in 1960, 86 tons), Endurance Tin Mining Company N.L., which carries out a sluicing operation at South Mt. Cameron (1960 production, 52 tons of tin in concentrates), Briseis Tin N.L. (Derby), Star Hill Syndicate (Gladstone) and Goshen Tin Mines (St. Helens), the last three also carrying out sluicing. There are also numerous individual miners and prospectors producing small tonnages.

Tungsten. In recent years practically the whole of Australian tungsten production has come from Tasmania. The principal producers are King Island Scheelite (1947) Ltd., operating at Grassy on King Island, Storey's Creek Tin Mining Company N.L., operating at Storey's Creek, and Aberfoyle Tin N.L., operating at Rossarden. In 1960 King Island produced 420 tons of scheelite concentrates, Storey's Creek 749 tons of wolfram concentrates and Aberfoyle 357 tons of wolfram concentrates; on a 65% WO₃ basis the equivalent production was 447 tons of scheelite concentrates and 840 and 400 tons of wolfram concentrates respectively. In previous years King Island had produced as much as 1,488 tons of scheelite concentrates (66.2% WO₃), but operations had been suspended from August, 1958, to January, 1960, as a result of low prices.

There was a marked improvement in tungsten ore prices in 1959 and 1960 from the low level of 1958, but prices again slipped in 1961. The general price weakness now obtaining means that the Tasmanian mines are faced with some difficulty in planning future development and production.

Other Minerals. Gold and silver are obtained as by-products from base metal mining operations. With the recent decline in production of osmiridium consequent on a sharp fall in export prices, there is now no direct production of the precious metals in Tasmania. Cadmium and sulphur (contained in pyrite or zinc concentrates) are also by-products of base metal mining. A small tonnage of iron oxide is mined at Penguin for use in cement manufacture and gas purification.

The value of output of non-metallic minerals (excluding coal and construction materials) is in the region of £350,000 annually; the bulk of this is represented by limestone, followed by clays. Substantial tonnages of construction materials are produced annually.

The coal industry in Tasmania is centred on the Fingal Valley. Production has been almost 300,000 tons annually in recent years, and Tasmania is virtually self-sufficient in black coal, but a tendency for industry to change over to fuel oil is presenting difficulties. The major producers in 1960 were Cornwall Colliery, St. Mary's (128,500 tons) and Duncan Colliery, Fingal (61,000 tons).

Metal Treatment. Blister copper has been produced at Mount Lyell since 1896; the electrolytic copper refinery was put into commission in 1928 and up to 30th June, 1961, had produced 314,330 tons of cathode copper; the copper is of grade 99.95% or better. Annual capacity of the refinery is 12,000 tons. Tankhouse slimes containing gold and silver are despatched to Port Kembla for treatment; in addition, about 300 tons of copper sulphate are produced annually.

In 1917 a pilot plant for electrolytic production of zinc was erected at Risdon by the Broken Hill companies. This was the beginning of the Risdon electrolytic zinc refinery, which has been operated since 1920 by Electrolytic Zinc Company of Australasia Ltd., and is now the third largest plant of its kind in the world. The present annual capacity is about 130,000 tons of zinc. As well as standard electrolytic high-grade zinc, high purity zinc, g.o.b. zinc, die-casting alloys, zinc dust, zinc sulphate and zinc dross are produced. Other metallic products are cadmium and cobalt oxide, which are obtained by precipitation from the zinc sulphate solution before electrolysis, and subsequent treatment of the precipitates, and manganese dioxide, which forms as a scale on the anodes of the electrolytic cells.

Roasting of the zinc concentrates prior to leaching produces large quantities of sulphur dioxide which is used in the manufacture of sulphuric acid by the contact process. Production of sulphuric acid in the year ended 30th June, 1961, was 135,000 tons, of which 37,000 tons were used in the manufacture of superphosphate and 46,000 tons in the manufacture of sulphate of ammonia at Risdon; 105,000 tons of superphosphate and 60,000 tons of sulphate of ammonia were produced in this period. Ammonia for the sulphate of ammonia plant is obtained by synthesis of nitrogen (produced by liquefaction of air) and hydrogen (produced electrolytically).

At the moment residues from the leaching circuit are stored, with a view to future treatment to recover some of the zinc, which is present largely in the form of zinc ferrite. These residues contain up to 10 percent of the zinc in the original concentrate feed, together with some lead and silver.

The Bell Bay alumina plant and aluminium smelter were put into operation in 1955 with an initial annual capacity of 13,000 tons of aluminium ingot, and employing conventional processes. Originally a Government enterprise, Bell Bay is now operated by Aluminium Production Corporation Ltd. (Apco), a division of the Comalco aluminium enterprise. Comalco Industries Pty. Ltd. owns two-thirds of Apco and the Tasmanian Government one-third. Production has risen in recent years to a peak of 13,204 tons in 1961, and capacity is being expanded at present to 32,000 tons per year, with further expansion to a capacity of 48,000 tons per year envisaged by mid-1964.

Besides aluminium ingot of 99.5% purity, super-purity aluminium (99.9%+) and aluminium alloys are produced. Billets and wirebars are cast, and a recent development is continuous casting of aluminium busbars for new cell units in the expansion programme. Not all the alumina produced is used in the reduction process, and the balance is sold; some aluminium hydrate is also sold, largely for production of aluminium sulphate.

The establishment of the plants at Risdon and Bell Bay was based in large part on the availability of cheap electric power. Similarly the favourable power situation in Tasmania has influenced the establishment of a new ferro-alloy plant at Bell Bay by Tasmanian Electro-Metallurgical Company Pty. Ltd. (Temco). This plant went into production early in March, 1962, at a rate of 25,000 tons of ferro-manganese per year, and will reduce imports of ferro-alloys, which have risen sharply in recent years.

Other forms of mineral treatment which are of interest are the production of titanium pigments by Australian Titan Products Pty. Ltd. at Burnie (11,482 tons of titanium dioxide were produced in 1960, and output has more than doubled since 1955), and Australia's only production of calcium carbide, by Australian Commonwealth Carbide Company Ltd. at Electrona (acetylene black is also produced).

Current Exploration and Prospects. Private enterprise, the Mines Department and the Bureau of Mineral Resources are all engaged in exploration for new deposits and examining deposits which may prove to be of economic importance. Regional and detailed geological surveys, geophysical surveys and diamond drilling are being undertaken, and helicopter transport has become a feature of mineral exploration on the west coast, where the terrain is rugged and inhospitable.

Possibly the most interesting current project is the testing of the Savage River iron ore deposits. This is being undertaken by Industrial & Mining Investigations Pty. Ltd., under an exploration licence granted in April, 1961, for a period of two years to enable the reserves of ore to be measured and the possibility of establishing a local iron and steel industry to be assessed. Prior to the granting of this licence drilling and geophysical surveys had indicated four magnetite-rich "lenses", in which reserves were estimated at 50 million tons, grade 45% but readily beneficiated to 66%. Total reserves at Savage River have been estimated at 200 million tons, grade 45%.

It is still too soon to make any conjecture about the future of the Savage River field, but even in the context of a possible substantial increase in Australian iron ore reserves elsewhere, it retains its interest. As well as the field programme, metallurgical investigations have been carried out. Depending on the results of these investigations and the availability of power, then the Savage River field may represent a future source of steel, or pig iron, or processed iron in some form suitable for blast furnace feed.

In the field of base metals, three major companies, Rio Tinto, Electrolytic Zinc and Mount Lyell, are carrying out regional investigations on the west coast. They are also engaged in examination, by geophysical work and drilling, of specific prospects, as is a fourth company, Aberfoyle. Several occurrences of cassiterite in sulphides (similar to Renison Bell) are being investigated, including prospects at Stanley River, Mt. Lindsay,

Cleveland and Dundas. Exploration for copper is being carried out in Moore's Valley in the south-west, south of Macquarie Harbour. The Mines Department is drilling for tin in the Dundas field, and proposes to drill in the same locality for silver-lead.

In north-east Tasmania, the Mines Department has drilled for lode tin at Branxholm, but with disappointing results. However, drilling for alluvial tin at St. Helens has given promising indications and is continuing. The Mines Department is also drilling for gold near Mathinna.

Coal and industrial minerals are also receiving attention. The Mines Department expects increased coal reserves to be proved as a result of drilling in the Fingal area. Private companies and the Mines Department are investigating limestone on the west coast and in the north, and kaolin in north-east Tasmania.

Exploration is thus at a high level, particularly on the west coast. Although much of the ground has been covered, and covered thoroughly, by prospectors towards the end of last century, it would not be unreasonable to expect new orebodies of some consequence to be found, particularly as a result of geophysical sub-surface surveys. Taking into account also exploration and development work being undertaken at existing mines, and metallurgical investigations in progress to improve mineral recovery from difficult ores, expansion and diversification of mineral production in Tasmania can confidently be expected.

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Mount Lyell Mining & Railway Company Ltd., Queenstown.

Renison Associated Tin Mines N.L., Renison Bell.

Storey's Creek Tin Mining Company N.L., Storey's Creek and South Mt. Cameron.

Table 1. Mineral Production in Tasmania, 1958-1960*

	Unit of qty.	1958	1959	1960
Metallic minerals				
Cadmium in mine products	ton	60	59	56
Copper in mine products	"	11,413	12,244	11,680
Gold in mine products	oz.	21,744	21,353	23,994
Iron oxide	ton	4,266	5,062	3,497
Lead in mine products	"	13,785	14,039	13,038
Osmiridium	oz.	42	3	—
Silver in mine products	"	1,394,818	1,369,070	1,398,424
Sulphur in pyrite and zinc cons.	ton	52,348	48,481	51,734
Tin in tin cons.	"	883	890	884
Tungsten cons. —	"	—	—	—
Scheelite, 65% WO ₃ content	"	734†	—	447
Wolfram, 65% WO ₃ content	"	554	992	1,240
Zinc in zinc cons.	"	33,760	32,475	31,625
Non-metallic minerals & fuels				
Clays —				
Brick clay	ton	83,044	153,880	157,244
Kaolin	"	3,302	1,195	964
Coal — black	"	276,268	299,368	297,670
Dolomite	"	2,585	2,907	2,678
Limestone —	"	—	—	—
for cement	"	179,171	176,930	152,720
other uses	"	55,857	59,290	62,488
Mineral pigments — ochre	"	66	59	31
Pebbles	"	746	634	515
Silica	"	6,625	6,519	5,249
Stone, sand and gravel	"	(e) 700,000	830,000	(e) 850,000

* See footnote on page 49.

† January-August.

Table 2. Production from Primary Treatment in Tasmania, 1958-1960*

	Unit of qty.	1958	1959	1960
Metals and metallic compounds				
Alumina	ton	22,490	26,900	29,801
Aluminium ingot	"	10,906	11,370	11,655
Cadmium —	"	—	—	—
from Read-Rosebery cons.	"	41	57	59
from Broken Hill cons.	"	236	209	203
Cobalt oxide —	"	—	—	—
from Read-Rosebery cons.	"	0.66	0.99	0.70
from Broken Hill cons.	"	23.66	21.69	21.82
Copper — refined	"	10,438	10,278	10,947
Manganese dioxide	"	3,361	3,694	3,847
Titanium dioxide	"	7,900	10,160	11,482
Zinc — refined	"	114,773	116,461	120,230
Zinc sulphate	"	906	985	569
Other products				
Acetylene black†	ton	182	165	166
Ammonium sulphate	"	53,367	54,940	60,086
Calcium carbide†	"	10,805	10,836	11,231
Cement†	"	147,208	136,873	108,161
Sulphuric acid	"	117,807	122,019	133,138
Superphosphate	"	106,016	97,133	104,334

* See footnote on page 49.

† Source: Mines Department.

ALUMINIUM

Production of aluminium ingot in 1961 was 13,204 tons, compared with 11,655 tons in 1960 — an increase of 13 percent. The quarterly production figures showed a steady rise throughout the year — 2,870, 3,275, 3,418 and 3,641 tons — reflecting steady expansion in capacity at Bell Bay.

On 30th January, 1962, a merger between Rio Tinto and Consolidated Zinc Corporation was announced in London. It has been surmised since then that much of the capital for Comalco's integrated aluminium complex in Australasia will be provided by Rio Tinto's uranium mining profits. A little before this it was formally announced that Aluminium Company of America (Alcoa) would lend Alcoa of Australia Pty. Ltd. £30 million at fixed interest, representing two-thirds of the capital requirement for the Alcoa aluminium enterprise in Australia.

On 13th February, the Canadian export price of aluminium was reduced by Alcan to 22.5 U.S. cents per lb.; the previous price was 23.25 U.S. cents per lb. The object of the cut was said to be to meet competition from European producers in Europe. The price of aluminium imported into Australia fell likewise on 14th February, from £233/10/- per ton c.i.f. to £225/18/- per ton c.i.f. The United Kingdom price for 99.5% Canadian ingot, delivered, fell from £186 per ton to £180 per ton.

Late in February it was announced that Aluminium Production Corporation Ltd., which is at present expanding primary ingot capacity at Bell Bay to 32,000 tons per year, had negotiated with the Tasmanian Hydro-Electric Commission for another block of power which will enable it to have an installed capacity of 48,000 tons per year by mid-1964.

It was also announced at the end of February that the terms of a contract for export of Weipa bauxite to Japan had been agreed upon. A total of 600,000 tons of bauxite would be shipped from Weipa to Japanese smelters over a three-year period, commencing in April, 1963. Delivery in the first year would be 150,000 tons, in the second year 200,000 tons, and in the final year 250,000 tons. An official price was not given, but it appears unlikely to exceed £3 per ton f.o.b.

BERYLLIUM

Production of beryl in Australia in the first nine months of 1961 was 240 tons containing 2,728 units of BeO. This compares with a production of 164 tons containing 1,909 units BeO during the first three quarters of 1960. Exports for the period were 136 tons in 1961, compared with 60 tons in 1960; all exports were consigned to the United States.

There has been no change in the beryl quotations in the United Kingdom and the United States in recent months. Prices ruling in February, 1962, were: United Kingdom stg.230/- - 250/- per unit for concentrates with a minimum 10% BeO content; United States domestic ore, 10-12% BeO, \$46-48 c.i.f. per short ton unit, and imported ore \$32.00-34.50 per short ton unit. During February the Australian Atomic Energy Commission announced that it had increased its buying price from £14 per unit delivered nominated stores in capital cities to £15/10/- per unit.

During the last quarter of 1961 there was some dampening of hopes concerning the immediate future outlook for beryllium metal. While demand for beryllium remains firm for its established uses such as in beryllium-copper alloys, the immediate prospect for nuclear applications has suffered some setback. The United Kingdom Atomic Energy Authority has stated that serious and persistent technical difficulties in the use of beryllium have forced it to cut its purchase programme and concentrate

research on the outstanding difficulties. Since there is practically no market for beryllium for non-nuclear purposes outside the United States at present, cancellation of the U.K.A.E.A. orders has led to a shut-down of the beryllium plant of Imperial Chemical Industries Ltd., at Birmingham; this plant has an annual capacity of some 7-10 tons of metal.

COAL

During the calendar year 1961 there was a considerable increase in the quantity of black coal produced in Australia. Actual production has not been finally determined but a preliminary estimate places the production of black coal from all sources at 24,118,000 tons. If confirmed this will be a record production, exceeding by 1.5 million tons the previous highest output of 22,575,000 tons in 1960.

The estimated production of brown coal in 1961 is 16,282,000 tons. This is again a record output and substantially exceeds the previous record production of 14,967,000 tons in 1960.

Exports of black coal for the year were 2,850,307 tons valued at £11,504,604. Of this total approximately 94 percent, or 2,669,045 tons, valued at £10,727,861, was shipped to Japan. These figures represent a substantial increase over Japan's 1960 purchases of 1.6 million tons or 89 percent of Australian black coal exports.

The entry of two large companies into Australian coal mining was announced in December and in January. In December the Rio Tinto Mining Company purchased collieries to the west and south of Sydney for operation by its subsidiary Rio Tinto Collieries Pty. Ltd. The company plans to increase production and install a modern coal-washing plant and is reported to be working in close co-operation with Mitsui Company Ltd. In January the State Minister for Mines, Queensland, announced that the Peabody Coal Company (U.S.A.) and Theiss Bros. had formed a joint company to develop the Kianga-Moura coalfield to the south-west of Gladstone. It was stated that firm orders had been obtained from Japanese steel interests for 3,400,000 tons of Moura and Kianga coal over the next seven years, an order worth more than £14,000,000. The joint company was said to be planning the expenditure of about £15,000,000 over the next six years in the development of the field, construction of a railway to Gladstone and the purchase of plant equipment and rolling stock. The coal handling facilities at Gladstone are to be improved to handle the increase in output.

COPPER

Although final data are not yet available preliminary information indicates that mine production of copper in 1961 was about 92,000 tons compared with the record 109,300 tons produced in 1960. The significant fall in production was to a large extent due to the industrial dispute at Mt. Isa, which accounted for a loss of production of about 12,000 tons in the final quarter. During the year despatches of copper in concentrates to domestic smelters were 58,700 tons and exports of copper in concentrates 27,100 tons; comparable figures for 1960 were 66,800 tons and 36,000 tons.

In the January-November period production of primary blister copper was 56,800 tons; in addition 1,800 tons of blister were produced from secondary materials. Production of refined copper in the same period was 74,700 tons of which 60,900 tons were of primary origin.

Total domestic despatches of refined copper in the eleven-month period were 54,800 tons compared with 63,300 tons for the whole of 1960. Exports of refined copper for the period were 23,000 tons, virtually all of which were in the first three quarters of the year; in addition to refined metal exports, 1,000 tons of blister copper were exported in September.

Following the relatively high level of domestic consumption in 1960, demand fell away early in 1961 as a result of the Commonwealth Government's financial measures to check inflationary pressures and to redress the balance of payments situation. However, the situation improved during the third quarter and with the cutback in production of refined metal as a result of a shortage of concentrates early in the fourth quarter, imports were necessary to cover the immediate position — of course, at the same time exports had fallen to negligible quantities. Total imports of copper in 1961 amounted to 3,761 tons of which 950 tons were imported in the October-December period.

The price of copper on the London Metal Exchange has been particularly stable for some time. Over the whole of 1961, the maximum variation in price was only £stg.32 per ton and in the last six months of the year the maximum and minimum prices were £234 per ton and £221 per ton respectively. In the first two months of 1962, the quotation moved marginally around £230 per ton. In the United States, the domestic producers' price was raised from 29 cents per pound to 31 cents per pound in May; there was no change in this quotation to the end of February, 1962. The Australia price of copper, which is based on the London Metal Exchange quotation with an arrangement to move only in steps of £10 per ton, has reflected the comparative stability of the London quotation; the last change in the Australian price was a reduction from £315 per ton to £305 per ton in July, 1961.

Deliveries of refined copper to fabricators in 1961 as reported by the Copper Institute were 3,704,000 short tons in 1961 compared with 3,497,000 short tons in 1960; virtually the whole of this increase was reported by United States producers. Refined copper production in the United States in 1961 was at about the same level as in 1960 but stocks fell quite significantly to the relatively low level of 78,000 short tons. Outside the United States although production and deliveries by producers were virtually unchanged in 1961 compared with 1960, stocks held by producers increased by 44,000 short tons and possibly represent, in part at least, metal taken up by some major producers as a means of preventing any excessive pressure on the market.

GOLD

On the basis of provisional data available the mine production of gold in the January-November period of 1961 was 977,500 ounces compared with 985,800 ounces in the comparable period of 1960. Increased production was recorded in Western Australia, Tasmania and the Northern Territory; however, the extent of these increases was quite small and they were offset by reduced levels of production in New South Wales, Victoria (both small), and Queensland, where production was down 11,054 ounces compared with 1960.

Refinery production of newly-won gold of domestic origin in 1961 was 1,036,947 ounces compared with 1,045,139 in 1960. Production from scrap was virtually unchanged at 22,593 ounces but production from imported bullion was approximately 13,072 ounces higher at 155,598 ounces.

During the January-November period 145,100 ounces of gold were imported in the form of unrefined bullion; the main sources of supply were Fiji, New Guinea and New Zealand. Exports of refined gold in the period were 1,066,350 ounces, the major proportion of which went to Hong Kong; exports in the comparable period of 1960 were 2,104,900 ounces, the bulk of which went to the United Kingdom.

On 14th January, 1961, it was announced that United States citizens could no longer purchase gold abroad and were to liquidate their holdings of gold by 1st June

of that year. This decision, and a declaration by President Kennedy that the United States intended to keep the official price of gold at \$35.00 per fine ounce, brought the price of gold on the London market to \$35.08 per fine ounce by February, 1961. These developments followed a period of intense speculation on world gold markets during the last quarter of 1960, during which the official price of gold reached a peak of \$40.50 per fine ounce.

Speculative liquidations, sales of gold by the U.S.S.R., and reduced activity by Central Banks maintained the price of gold within comparatively narrow limits around \$35.08 until June.

During the third quarter of 1961, steady demand and a reduced supply of gold resulted in an increase in price which reached \$35.14 at the end of July and \$35.20 in September. Lack of Central Bank purchases remained a feature of the London bullion market and the price of gold eased during the final quarter of 1961 to around \$35.16.

IRON AND STEEL

Domestic production of iron ore for the first three quarters of 1961 was 3,955,284 tons, comprising 2,946,331 tons from the Middleback Range area of South Australia, and 1,009,253 tons from Western Australia (955,917 tons from Yampi Sound and 53,336 tons from Koolyanobbing). Production for the same period of 1960 was 3,218,966 tons. Imports of iron ore from New Caledonia for the first nine months of 1961 were 198,845 tons valued at £240,465.

New record production levels were established for pig iron and ingot steel in 1961. Pig iron production for the year was 3,159,393 tons and ingot steel production was 3,872,682 tons. It is expected that pig iron production will increase still further when the installation of the No. 4 blast furnace at Newcastle is completed. Ingot steel capacity will also increase following the completion early this year of a fifth open hearth furnace in the No. 2 shop at Port Kembla.

Tinplate production remained steady at 101,594 tons in 1961. The new electrolytic tinning line at Port Kembla should be ready to commence production early this year and the annual capacity will be increased by 60,000 to 70,000 tons.

In January, 1962, Commonwealth Steel Company Ltd. announced plans for a £1 million extension programme for its works at Newcastle. The extensions will include additions to the forge plant, a new heavy machine shop, and the redesigning and installation of new plant in the tyre and wheel department.

An agreement granting a 21-year lease, with the right of renewal, to mine and export iron ore from deposits at Mt. Goldsworthy was signed in Perth on 27th February between the Western Australian Premier, on behalf of the State Government, and three joint tenderers for the project, Consolidated Gold Fields (Aust.) Pty. Ltd., Cyprus Mines Corporation of Los Angeles, and Utah Construction and Mining Co. of San Francisco.

The Mt. Goldsworthy deposit is at present estimated to contain 30 million tons of high-grade iron ore. However, under present Commonwealth legislation only one-half of the proved reserves may be exported.

A decision to proceed with development will depend on the outcome of an 18 months' preliminary investigation which would start immediately and is expected to cost £300,000. Dependent on the results of this investigation the three joint tenderers may undertake a programme of developmental works involving an expenditure of up to £12 million. Full-scale production on which a royalty of 7½ percent on the value of the ore mined would be payable would be scheduled to begin about 2 years later. After 21 years an additional royalty of 2/6 a ton, with a minimum of £78,500 a year, would be payable.

Major works to be completed within the developmental period would include:

- (i) Construction of a deep water port for large ore carriers at Depuch Island, 60 miles south-west of Port Hedland.
- (ii) Construction of a causeway and bridges to link the island to the mainland.
- (iii) Construction of 120 miles of standard gauge railway between Depuch and the Mt. Goldsworthy deposits.
- (iv) Construction of engineering facilities and townships at Mt. Goldsworthy and Depuch Island.

LEAD

Although final data are not yet available information to hand indicates that mine production of lead in 1961 was 270,000 tons, 12 percent below that recorded in 1960 and 19 percent below the peak of 334,000 tons recorded in 1957. The principal fall in production in 1961 was at Broken Hill but there was also a reduction of about 11,000 tons at Mt. Isa following the dispute at that mine during the final quarter. As a result of the steady decline in prices production from small mines has fallen to less than 2,000 tons annually.

Production of primary refined lead in 1961, 162,000 tons, was also substantially below that of recent years, reflecting the agreement entered into by the Broken Hill Associated Smelters Pty. Ltd. with the United States Government with respect to the removal into the barter stockpile of stocks accumulated since restrictions on sales were first introduced in the second half of 1959. The recovery of secondary lead (excluding remelt) during 1961 was 16,600 tons.

At Mt. Isa, the production of lead bullion was 39,400 tons compared with 52,700 tons in 1960, again as a result of the strike. At Cockle Creek (New South Wales) the new smelter of Sulphide Corporation Pty. Ltd. was brought into production and to the end of December production at that centre was 9,000 tons.

Shipments of pig lead were somewhat higher in 1961 than in 1960. Shipments for the year were 141,000 tons and in the closing months of the year the first deliveries from accumulated stocks were made to the United States barter stockpile. Total shipments of bullion for the year were 49,000 tons, including the first deliveries from Cockle Creek. The lead content of concentrates shipped in 1961 amounted to 60,000 tons.

With the domestic price of pig lead somewhat higher than the equivalent London Metal Exchange quotation, consistent imports of small quantities of lead have developed. In 1960, it is estimated that 300 tons were imported and to the end of November, 1961, an additional 2,500 tons were reported in official trade statistics.

In November, 1961, the domestic lead price was reduced from £100 per ton f.o.b. Port Pirie to £95 per ton; in February, 1962, there was a further reduction to £85 per ton. On the London Metal Exchange the lead price moved below £stg. 60 per ton in mid-November and after a period of some slight recovery fell away again; throughout January and February it moved fractionally about £stg. 58 per ton. At the end of February, the price was £stg. 59½ per ton. In the United States there was no change in the domestic price from mid-December, 1960, to November, 1961. The price fell from 11.0 cents to 10.5 cents on 1st November and subsequently in steps to 9.5 cents early in February.

Developments in the lead market following the third session of the International Lead & Zinc Study Group at Mexico City in March, 1961, have been disappointing. It will be recalled that following that meeting it had been predicted that consumption would exceed availability of new supplies of lead over the whole of 1961, permitting a

run-down in stocks. Furthermore, with the successful conclusion of barter deals a further fall in producers' stocks would have been possible. However, the projected deficit did not eventuate and at the fourth session of the Group, held in Geneva in October, a significant surplus was forecast. The predicted performance for 1961 has, of course, been borne out by market developments with a further fall in price both in London and in the United States and a significant accumulation to producers' stocks, all in the United States. Producers' stocks outside the United States have fallen but this reduction has been more than offset by the United States increases.

Excluding the reduction in production at Mt. Isa due to the strike, the falls in both mine production and refined metal production in Australia during 1961 reflect the commitments entered into by sections of the Australian industry at Mexico City. Although some countries indicated their intention to maintain operations at reduced levels at least until the end of the first quarter of 1962, there is no doubt that if some effective measures are to be taken to permit a significant reduction of stocks and result in an increase in price, more effective and widespread participation by members of the Group would be essential. Whether this can be achieved remains to be seen.

The fifth session of the Study Group, held at Geneva in March, 1962, was adjourned till 28th May, 1962.

MANGANESE

During the period January-September, 1961, domestic production of manganese ore was 38,116 tons of metallurgical grade, 731 tons of battery grade, and 339 tons of intermediate grade. The total production of 39,286 tons of ore for the period is approximately 6,500 tons below that for the corresponding period of 1960: 38,093 tons represented shipments of metallurgical grade ore from Western Australia, of which 37,527 tons were exported to Japan.

Imports of manganese ore have continued to rise and amounted to 2,497 tons for the first nine months of 1961; the bulk of these imports was of battery grade ore.

Ferro-manganese imports increased sharply in the third quarter of 1961 to bring the total imports for the first three quarters of the year to 30,274 tons, valued at £1,644,853. This is only slightly below the record level of imports reported for the whole of 1960.

Domestic and overseas prices of manganese ore remain at a depressed level. World demand has given no indication of expanding, while supplies remain plentiful. Two factors contributing to this are the large stocks of ore held in American stockpiles, and the fall in steel production during the year in the United Kingdom.

Early in March, 1962, the Bell Bay plant of Tasmanian Electro-Metallurgical Company Pty. Ltd. (Temco) went into operation, producing ferro-manganese at a rate of 25,000 tons per annum.

MONAZITE

Heavy sales of Australian monazite concentrates in the early part of 1961 (1,344 tons in the first half of the year) depleted domestic stocks and recorded sales for the third quarter of 1961 were only 19 tons. Treatment of large stockpiles of low-grade monazite concentrates on the east coast is expected to considerably expand production of high-grade monazite concentrates during 1962.

Overseas, demand for monazite continues firm in the United States and in Europe, emphasis being on rare earth content rather than thorium content. Ronson Metals Corporation have expanded production capacity of mischmetal at their Newark (N.J.) plant by 30 percent and have expanded research and developmental facilities for rare earth metals and alloy products.

PETROLEUM

By Petroleum Technology Section

The activities of the companies and groups engaged in oil exploration during the period 1st December, 1961, to 28th February, 1962, are summarised below and programmes, as announced for 1962, are given. Table 1 shows the latest availability of final reports on subsidized operations.

Queensland: At the Union-Kern-A.O.G. Moonie No. 1 Well, a flow at a rate of 500 barrels per day of oil and water was announced on 3rd December, 1961, after a drill stem test of the zone between 5,816 and 5,926 feet. The production was from Triassic beds and the source beds are thought to be Permian sediments wedging on to the basement. The oil and water were understood to be coming from different intervals in the zone. The oil was 48° API gravity black crude. The well drilled ahead and entered basement at about 6,100 feet on 5th December, 1961. The well was cased and sustained production testing undertaken.

On 17th December, 1961, the first production test gave 1,765 barrels per day. On 24th December, 1961, more sustained testing gave 2,196 barrels per day; the interval being tested was the "main sand" between 5,816 and 5,925 feet.

On 27th December, 1961, the 30-day production test commenced and, after delays caused by rain, finished on 21st February, 1962. Over a 21-day period, the well was tested at daily rates ranging from 184 to 1,920 barrels per day of 45° API gravity oil. Natural gas production was recorded at 36,000-528,000 cubic feet per day. The Petroleum Information Bureau states that Australian refineries would be able to refine Moonie crude.

Union Oil Development Corporation has stated that its parent body, Union Oil of California, has allotted a major part of its overseas exploration funds to Australia; the amount to be spent in the Surat Basin in 1962 is £2.0 million, and 6 wells will be drilled.

The company will carry out a programme of drilling and testing during 1962 to assess the commercial possibilities and a series of wells will be drilled in the vicinity of Union-Kern-A.O.G. Moonie No. 1 to determine the size and productive potential of the reservoir. Union Oil of California states it is prepared to invest up to £90 million in oil development in Australia. Union-Kern-A.O.G. Moonie No. 2 was spudded in on 14th February, 1962, 2/3rd mile south-west of Union-Kern-A.O.G. Moonie No. 1, where potential producing formations are believed to be structurally higher. A drill stem test carried out on 28th February on the interval 5,651-5,675 feet produced at the rate of 2,592 barrels of 51° gravity oil per day and 197,000 cubic feet of gas per day. The well will be cored and drilled to the equivalent depth of the producing sand at Moonie No. 1, estimated at 5,800 feet. It is estimated that the total depth of Moonie No. 2 will be about 6,500 feet. Definite plans for the Surat Basin announced by Union Oil Development Corporation include a third well located to the north-east of Moonie No. 1 and a wildcat well in the Wandoon area, 160 miles north of the Moonie wells.

At A.A.O. Glentulloch No. 1 Well, drilled by the Associated group (Associated Australian Oilfields N.L., Associated Freney Oil Fields N.L., The Papuan Apinaipi Petroleum Co. Ltd., Interstate Oil Ltd. and Sleigh Exploration), results of drill stem tests of the following intervals were—

2470-2530 ft.	1.75 million cu.ft./day
2535-2550 ..	0.20
2579-2720 ..	2.52
2727-2809 ..	2.90

Table 1. Availability of Final Reports on Subsidized Operations
(Supplementary to Vol. 14, No. 2, pp. 30-32. No further final reports have been published.)

NAME	OPERATION	TYPE	COMPANY*	AVAILABILITY OF FINAL REPORTS
SURAT BASIN				
Moree — Miles		Aeromagnetic	Union — A.O.G.	11/11/62
Injune — Wallumbilla		Seismic	A.A.O.	15/11/62
Dulacca		Seismic	Union — A.O.G.	7/12/62
Moonie 1		Strat. drilling	Union — A.O.G.	25/12/62
GREAT ARTESIAN BASIN				
Eromanga		Gravity	Smart	14/7/62
Glentulloch 1		Strat. drilling	A.A.O.	22/7/62
Meeleebee 1		Strat. drilling	A.A.O.	19/8/62
Simpson Desert		Seismic	Geosurveys	8/9/62
Urisino		Gravity	Smart	28/9/62
Blackwater — Lango		Seismic	Phillips	6/10/62
Mayne		Seismic	Conorada	10/11/62
Charleville North		Seismic	Phillips	24/11/62
Innaminka — Mt. Gason		Seismic	Delhi-Santos	29/11/62
Balmoral		Seismic	Longreach	9/12/62
Stonehege		Seismic	Conorada	15/12/62
Oodnadatta		Aeromagnetic	Delhi-Santos	8/1/63
Maneroo		Seismic	A.A.O.	28/1/63
Kogan		Seismic	Phillips	3/3/63
SYDNEY BASIN				
Sydney Basin		Seismic	A.O.G.	12/8/62
Mount Hunter 1		Strat. drilling	A.O.G.	1/3/63
OFF-SHORE (S.E. Australia)				
Anderson's Inlet		Aeromagnetic	Oil Development	October, 1962
Bass Strait		Aeromagnetic	Haematite	1/12/62
Encounter Bay		Aeromagnetic	Haematite	22/12/62
OTWAY BASIN				
Penola 1		Strat. drilling	Oil Development	5/5/62
Beachport 1		Strat. drilling	South East Oil	6/1/63
Dartmoor — Nelson		Seismic	Frome-Broken Hill	15/2/63
PERTH BASIN				
Eneabba 1		Strat. drilling	Wapet	27/11/62
CARNARVON BASIN				
Wandagee Ridge		Seismic	Wapet	7/2/63
Salt Marsh		Seismic	Wapet	26/2/63
BONAPARTE BASIN				
Carlton		Gravity	Oil Development	27/10/62

* The following abbreviations are additional to those already published:—

Haematite — Haematite Explorations Pty. Ltd.
Longreach — Longreach Oil Ltd.
South East Oil — South East Oil Syndicate Ltd.

The gas was produced from the Permian section and was reported by the Queensland Department of Mines to be less petroliferous than that at A.A.O. Pickaninnie No. 1 to the south-east.

The well bottomed on 25th December, 1961, in basement (Timbury Hills Formation) at 4,086 feet. Following production testing, the well was shut-in.

A.A.O. Meeleebee No. 1, also drilled by the Associated group, spudded in on 12th January, 1962, 60 miles south-east of A.A.O. Glentulloch No. 1 Well and was programmed to about 5,000 feet. Depth on 16th February was reported to be 4,866 feet. The Permian section is thicker than that found in A.A.O. Pickaninnie No. 1, A.A.O. Winnathoola No. 1 or A.A.O. Combarngo No. 1 Wells.

The Associated group spudded in A.A.O. Westgrove No. 1 on 15th February, 1962, 18 miles north of A.A.O. Glentulloch No. 1. The well was programmed to 5,000 feet and is sited on a very extensive structure on which several wells will be drilled.

Another well site 10 miles south of A.A.O. Glentulloch No. 1 Well was being prepared for the move of the rig from A.A.O. Meeleebee No. 1. This well was scheduled to start drilling in early March, 1962.

The companies have announced that they plan to drill 9 wells in the first 9 months of 1962 in the Injune-Roma area. Three seismic teams and at least two rigs will be operating. £1.25 million will be spent by them on exploration in Queensland in 1962.

Phillips-Sunray Etonvale No. 1 was reported at the end of February drilling below the initial target depth of 10,000 feet. The well will drill to 12,000 feet or basement to obtain information on the thick Palaeozoic section penetrated which has not been correlated with strata elsewhere in Queensland. After this well is completed, the rig will move to drill Phillips-Sunray Gumbardo No. 1 to 15,000 feet. This site is near Adavale.

Phillips Petroleum Company and Sunray Mid-Continent Oil Company have announced that they will spend £1.5 million in Queensland and will drill 6 or 7 wells in 1962; four wells are planned in the Boulia area and a deep well in the Dalby area after seismic work is completed. The companies have had three seismic crews operating continuously in Queensland during 1961, surveying 16,000 square miles.

The Standard Gas Pty. Ltd. Cribb Island well drilled to 2,000 feet and was being sealed off in January, 1962, to prevent entry of any more water. It should then be possible to test the gas which has been flowing since drilling from 900 feet to the present depth.

Ohio Oil International of Australia Ltd. and Continental Oil Company of Australia Ltd. announced that they will be spending £500,000 per annum on exploratory work on their tenement north of Roma. Seismic work was expected to begin in February, 1962.

Oil Development N.L. has announced a share issue, the £500,000 proceeds of which will be used mainly towards financing the drilling of structures determined by seismic and other surveys in the company's tenement in the Alpha district.

Australian Oil and Gas Corporation Ltd. has been granted a tenement over 57,000 square miles off-shore of the Queensland coast over an area 700 miles long, extending 140 miles off the coast at its widest point. The tenement covers most of the Great Barrier Reef from Bundaberg to north of Cairns. The company intends first to carry out an aeromagnetic survey over the area.

Planet Oil Company N.L. (recently formed) intends to carry out a seismic survey shortly in the Bowen Basin. Several wells are planned in the Planet Downs area, at least one in 1962, to be preceded by 30 crew-months of seismic survey.

Exoil N.L. has announced it will explore part of the Lucky Strike tenement on the edge of the Great Artesian Basin.

Pacific American Oil Company announced in January, 1962, that it plans to drill a well near Maryborough.

Nortex Australian Oils Ltd. announced in January, 1962, that it plans to drill a well in the Callide Valley, Central Queensland.

The Commonwealth Bureau of Mineral Resources No. 1 Seismic Party operated in the Tambo area during the first half of December, 1961.

New South Wales: Australian Oil and Gas Corporation Ltd. has reported that it intends drilling its Mt. Hunter No. 1 Well below the original target depth of 2,500 feet to 3,500 feet. Last reported depth of the well on 18th January, 1962, was 2,538 feet. Small gas shows have been encountered at 211, 2,280, 2,423, 2,480 and 2,531 feet.

Clarence River Basin Oil Company N.L.'s Clifden No. 2 Well near Grafton struck gas flowing at 100,000-300,000 cu.ft. per day from the 1,913-1,932 foot interval. The gas was sealed off, casing cemented and the well prepared to drill ahead. It was announced that, if the gas persisted and increased in volume when drilling recommenced, it was intended to assess the quantity of gas available for distribution.

Planet Oil Company N.L. has contracted to buy a tenement covering 203,000 acres in the Sydney Basin, north of Newcastle. A seismic survey has commenced in the lower Hunter Valley. The company is considering a proposal to drill stratigraphic wells in its Murray Basin tenement.

Woodside (Lakes Entrance) Oil Company N.L. plans to begin shortly seismic surveys in the Coonamble area of the Sydney-Oxley Basin and over the Mount Jack Anticline in the Great Artesian Basin south and south-west of the Surat Basin. Geological mapping and photo-geology have been carried out over a large part of its tenements in the Great Artesian Basin and are being extended. The company is considering plans for drilling a stratigraphic well in the Murray Basin and hopes to discuss the project with companies with tenements in the vicinity.

Mid-Eastern Oil N.L. is being floated to acquire from Woodside (Lakes Entrance) Oil Company N.L. three of its tenements in N.S.W., one in the Clarence Basin and two in the Great Artesian Basin.

Victoria: Arco Ltd. (the Australian subsidiary of The Atlantic Refining Company) in association with Woodside (Lakes Entrance) Oil Company N.L., spudded in Wellington Park No. 1 Well, in east Gippsland, on 3rd December, 1961. The well was programmed to 12,000 feet. Last reported depth on 10th February, 1962, was 8,888 feet: the well had been in Jurassic sediments, mainly sandstone, siltstone, shale and arkose, for the last 5,000 feet. Small traces of dead oil of no significance were reported at 5,050 feet. A drill stem test on a fracture zone at 8,751-8,888 feet produced methane. The well was drilling ahead at the end of February.

The companies' efforts are being concentrated in the Gippsland area where extensive seismic surveys, to commence early in 1962, were planned from Lakes Entrance to Corner Inlet (near Wilson's Promontory). The first survey will be over the area where previous seismic work indicated the presence of additional sub-surface structures in the vicinity of Lake Wellington. Later in 1962 it is proposed to extend the seismic surveys to cover off-shore areas. A further well or wells will be drilled in the area in 1962 but sites have not yet been determined.

Oil Development N.L. plans to drill two or more wells to a depth of 4,000-5,000 feet in the Torquay area, on stratigraphic wedge-out prospects disclosed by the 1960 seismic survey.

Planet Oil Company N.L. will begin a seismic survey shortly in the Otway Basin in the Casterton area.

South Australia: The South East Oil Syndicate Ltd. well, Beachport No. 1, was deviated at 1,640 feet when the fish at 3,106 feet could not be recovered. On 4th January, 1962, drilling ceased. It has been stated that the well may be deepened later.

Delhi Australian Petroleum Ltd. and Santos Limited have announced that they will start drilling in March, 1962, an exploratory test well, Dullingari No. 1, 40 miles south of Innamincka, to 11,500 feet. It is stated that the cost will be a charge against the balance of about \$900,000 still to be expended by Delhi Australian Petroleum Ltd. to earn its 50% interest in Santos Limited concessions.

Beach Petroleum N.L. plans to commence drilling a well at Grange, in April, 1962, to a depth of 5,000 feet. The company also plans a shallow test at Port Gawler, seismic exploration on Yorke Peninsula and across St. Vincent Gulf, seismic exploration

in the vicinity of Geltwood Beach where, later, a stratigraphic test well will be drilled to 5,000 feet and a complete seismic survey over the Andado Anticline in the Simpson Desert where a 5,000 foot combined stratigraphic and structural test well will be drilled.

It is announced that Santos Limited will contribute to the cost of the well at Grange in return for a 16⅓% interest in any oil and gas production from the well and the adjacent 100 square miles.

Oil Development N.L., on a joint basis with Santos Limited and possibly other companies, commenced on 2nd February, 1962, a shallow drilling programme in the Mount Salt area in the Gambier Basin, on a farm-out arrangement with General Exploration Company of Australia Ltd., to site a 7,500 foot well. The drilling of this well will earn for Oil Development N.L. and its operational partner a permanent 50% interest in two selected blocks each of area 100 square miles.

Exoil N.L. has announced it will explore a large area near the Western Australia, South Australia and Northern Territory borders.

The South Australian Department of Mines has been concentrating on seismic work to help locate stratigraphic drilling targets in the Great Artesian Basin area. It has sunk exploratory holes on Yorke Peninsula.

The Department announced in February, 1962, details of a £200,000 programme to be undertaken in 1962. Seismic work will be undertaken in the south-east of the State in the Penola-Nelson area, Penola-Millicent area, Joanna-Beachport area, Narracoorte-Robe area, Coorong-Cape Jaffa area and Loxton area. In the Great Artesian Basin, seismic work will be carried out in the Strezlecki-Innaminka-Kalladeina area, the Finke-Macumba Creek-Lake Eyre area and the Simpson Desert area.

Western Australia: West Australian Petroleum Pty. Ltd. has announced a programme of five wells planned for 1962 — three in the Kimberleys, one in the Perth Basin as a follow-up to Eneabba No. 1 and one in the Carnarvon Basin. Scheduled net expenditure in 1962 is reported to be in excess of £2 million. Babrongan No. 1 Well, about 120 miles east of Broome, was expected to be spudded in March, 1962.

Two seismic crews will be employed throughout 1962 in the Perth, Canning and Carnarvon Basins. Two seismic crews are at present operating in the Salt Marsh area, 100 miles north of Carnarvon and one seismic crew is in the Wandagee Hill area, 50 miles east of the Salt Marsh area, compiling about 250 miles of seismic survey lines. One seismic party has begun a survey of a large area between Eneabba No. 1 Well and the coast and contracts are being negotiated for a gravity party to extend mapping north of Eneabba No. 1 Well.

Northern Territory: Oil Development N.L. and Westralian Oil Ltd. planned a 5,000-6,000 foot well to commence drilling March, 1962, on a structure delineated by a seismic survey in 1960 in the Bonaparte Gulf area.

Papua and New Guinea: Oil Search Ltd. has announced that negotiations are being entered with The Burmah Oil Company Ltd. and Murphy Corporation regarding the development of the gas resources of various tenements held by Australasian Petroleum Co. Pty. Ltd. and Island Exploration Co. Pty. Ltd. The company states there are 40 oil and gas prospects, 13 of which are suitable for drilling.

The Triton Corporation has been granted a 10,000 square mile tenement in western Papua. Much of this has been previously explored by Australasian Petroleum Co. Pty. Ltd. who drilled a 6,628 foot well at Aramia in the area.

SILVER

During 1961 world demand for silver again exceeded production; it is estimated that during the year consumption was 300 million ounces and production 235 million ounces. This shortfall in the production of silver has been a feature of the silver market since early 1959, but except for minor speculative fluctuations the price of silver remained comparatively stable until October, 1961. Between January and October, 1961, the official London spot price of bar silver remained within the limits of stg. 79½ pence and 80 pence per ounce.

This comparative price stability of recent years was due to sales of silver by the U.S. Treasury from its stocks of "free" silver to United States industrial consumers. The Treasury offered this silver at 91 cents per fine ounce for delivery at Branch Mints in the western United States; the price delivered New York, allowing for transport costs, was equivalent to 91½ cents per fine ounce.

When the price of silver tended to rise above 91 cents, industrial consumers in the United States drew on the Treasury "free" stocks for their requirements. Since the price of silver outside the United States was consistently at a premium compared with the U.S. Treasury selling price, much of the silver mined in the Western Hemisphere found its way to Europe or Japan. The continuing pressure of demand caused U.S. Treasury "free" stocks to decline rapidly, falling from 126 million ounces at the beginning of 1961 to 22 million ounces at the end of November.

On 28th November, President Kennedy authorised the Secretary of the U.S. Treasury to suspend further sales of "free" silver and the use of this metal by the Treasury. Following the official announcement concerning the United States silver position there was an abrupt rise in the price on the London market — in December the highest price for spot silver was 88½d. per ounce. Since then there has been some slight reaction with the peak prices in January and February, 1962, being 88½d. and 86½d. respectively. In the United States, the peak price recorded following the decision to freeze "free" stocks was 104.75 cents per ounce on 15th December; this price was maintained to 16th January then fell away and at the end of February the price was 101.5 cents per fine ounce. Open market prices since the end of November have probably been affected to some extent at least by the liquidation of stocks held back in anticipation of the United States decision.

The bulk of the world's production of new silver is as a by-product of base metal mining operations. Under the circumstances, it is unlikely that the recent increase in silver prices as such will induce the majority of producers to increase their production. Of the total Australian production of 15.2 million ounces in 1960, 13.6 million ounces were contained in lead concentrates, 0.7 million ounces in copper concentrates and 0.65 million ounces in zinc concentrates. Production in 1961 is expected to be somewhat lower as a result of a cut-back of lead production. Looking to the future, it is expected that the level of mine production of silver will be dictated by the situation in the base metal markets and not the silver market.

SULPHUR

Production of sulphuric acid in the first nine months of 1961 was 891,419 mono-tones. During the third quarter, production declined by approximately 15 percent compared with the previous quarter; however, the total for the year is expected to exceed the peak of 1,109,662 mono-tones recorded in 1960.

The decreased production during the third quarter was of a seasonal nature; falls were recorded in the quantity of acid produced from brimstone and pyrite but there was

a small increase in production from spent oxide, alkylation sludges and hydrogen sulphide as well as from lead and zinc concentrates. The increase from lead-zinc concentrates follows the commencement of acid production from lead-zinc sinter gases at Cockle Creek (N.S.W.) in June, 1961; this plant has a rated capacity of 250 tons of sulphuric acid per day.

In the third quarter of 1961, 75.6 percent of sulphuric acid produced was used in the manufacture of superphosphate, 7.6 percent in the manufacture of ammonium sulphate and the remaining 16.8 percent was sold to other industries. Superphosphate production during the period was 607,399 tons, bringing the total to the end of the third quarter of 1961 to 2,035,821 tons.

The production of pyrite during the September quarter was 65,002 tons, of which 60,868 tons were used in acid making. Imports of brimstone during the quarter were 46,431 tons, bringing the total to the end of the third quarter to 146,253 tons, 19 percent lower than in the corresponding period of 1960. The average f.o.b. prices of brimstone from the United States and Mexico in the third quarter were £12/3/5 per ton and £9/18/8 per ton respectively; comparable prices in the second quarter were £10/2/7 per ton and £10/10/3 per ton.

Production of sulphur outside the Communist bloc is estimated at 18.7 million tons in 1961, an increase of about 4 percent on the 1960 level. The main expansion is expected in the output of brimstone recovered from natural gas which is estimated to be 450,000 tons higher than in 1960, mainly as a result of French and Canadian operations. As world consumption of brimstone in 1961 did not increase to the extent expected it appears that world stocks of brimstone will have increased by approximately 300,000 tons.

It is reported that as a result of the growing domestic consumption in the United States, Frasch sulphur production in that country increased in the third quarter of 1961 to an average monthly rate of 470,000 tons. The amount of sulphur recovered from other sources in the United States is being maintained at a level in excess of 70,000 tons per month and this is readily absorbed by the market.

Production of Frasch sulphur in Mexico in the first half-year was 532,000 tons, which is about 2 percent higher than in the same period of 1960.

The recovery of sulphur from natural gas by Societe Nationale des Petroles d'Aquitaine at Lacq is being raised to full plant capacity of 4,000 tons per day. Deliveries are being maintained at a level of about 80,000 tons per month, of which about 30,000 tons are used within France.

The amount of sulphur recovered from natural gas in Alberta and British Columbia has risen to about 40,000 tons per month; during the January-May period of 1961 production amounted to 192,400 tons of which about 116,000 tons were delivered to consumers in Canada and the north-western United States.

TIN

Mine production of tin in the third quarter of 1961 was 607 tons, bringing the total for the first nine months of the year to 1,855 tons. At this rate, production for the year may exceed 2,500 tons. Smelter production of primary tin improved in the fourth quarter, and the total for the year was 2,566 tons; about 188 tons was recovered from secondary sources. This rate of smelter production was the highest recorded in the post-war years.

The second and third meetings of the International Tin Council (Second Agreement) were held in London on 10th-12th January, 1962. It was announced that as at

31st December, 1961, the requisite number of instruments of ratification of the Second International Tin Agreement had not been deposited, and it had been agreed to continue the Agreement on a provisional basis until 30th June, 1962, up to which date instruments of ratification could be deposited. This was brought about by the failure of one of the producers, Bolivia, to ratify.

The Council agreed to raise the floor price under the Agreement from £stg.730 to £stg.790 and the ceiling price from £stg.880 to £stg.965; the range is divided £stg.790-£stg.850-£stg.910-£stg.965. This revision represents a compromise with the producers' demand for a ceiling price of £stg.1000 per ton.

It was reported early in February that release of stockpile tin by the General Services Administration might be held up if tin is included in a general list of proposed stockpile releases said to have been requested by the House Armed Services Committee. Even if tin is considered separately, there seems little likelihood of any release before mid-1962.

In the period December, 1961, to February, 1962, the Australian price of tin showed a progressive drift downwards to the end of December and thereafter moved in the range £1225-£1245. The London price fell from £stg.956½ at the beginning of December to £stg.937½ on 28th December, the lowest price since mid-October. Thereafter it recovered slightly and from mid-January moved in the range £stg.940-£stg.955, with a slightly firmer tone developing.

TITANIUM

Rutile: Production of rutile concentrates from the east coast during the third quarter of 1961 was 24,030 tons; in addition, recorded shipments of rutile concentrates from Western Australia during the quarter were 101 tons.

Production of rutile concentrates from the east coast for the period January-September, 1961, was 73,000 tons. Recorded exports of rutile concentrates from Australia for the third quarter of 1961 were 23,980 tons valued at £698,510 f.o.b.; total exports for the first three quarters of the year were 73,008 tons valued at £2.46 million.

It was announced early in February, 1962, that the joint tender made on behalf of Peko-Wallsend Investments Ltd. (who recently took over National Minerals Holdings Ltd.) and Coffs Harbour Rutile N.L. for the du Pont rutile contract had been successful. The contract involves the supply of 30,000 tons of rutile per annum for five years with an option after one year for an increase to 50,000 tons per annum. Shipments are to be made in bulk lots of 10,000 tons. It is understood that shipments from Newcastle will commence in October, 1962. Negotiations are reported to be in progress for a bulk shipment of 10,000 tons of rutile by northern producers to meet du Pont's requirements in the meantime.

Peko-Wallsend Investments Ltd. and Coffs Harbour Rutile N.L. have announced that they will form a joint managerial company, Rutile & Zircon Mines (Newcastle) Ltd., to control the combined operations of the two companies. On the basis of current estimated capacities, the companies will have to increase plant capacity by about 15,000 tons of rutile per annum to meet contract commitments, if indeed all shipments are to be made from the companies' own combined output. In effect there will be a further increase in the capacity of the industry which is currently operating below optimum levels.

The rutile market continues to strengthen and the United Kingdom price for spot material was quoted in February at £stg.32 per ton c.i.f. (equivalent to about £A32 f.o.b.).

Ilmenite: Shipments of ilmenite concentrates from Western Australia (including those for domestic consumption) were 50,546 tons in the third quarter of 1961 (113,149 tons for the January-September period). Recorded exports during the third quarter were 39,404 tons valued at £135,965 f.o.b., bringing total exports for the January-September period to 88,656 tons valued at £370,166 f.o.b.

In recent months ilmenite producers in Western Australia have negotiated additional overseas contracts and it seems likely that Australia will secure some markets previously supplied by other producers. Although world consumption of ilmenite for pigment making increased in 1961, the market is highly competitive and prices remain correspondingly low.

Titanium: According to Titanium Metals Corporation, shipments of titanium mill products by United States producers in 1961 are estimated at 5,675 short tons, slightly higher than the previous record established in 1957 and approximately 12 per cent higher than 1960 shipments. Increased shipments of titanium are attributed to increased usage in missile and space work as well as improved demand in more conventional fields. The composite price for titanium mill products now stands at \$6.10 per pound, compared with \$6.97 per pound at the end of 1960 and \$10.55 per pound in 1957.

The break-up of U.S. titanium shipments in 1961 was as follows: 64 percent for military jet aircraft, 25 percent for production of missiles and space probes, 5 percent for commercial jet aircraft, 4 percent for ordnance applications, and 2 percent for the chemical industry. Titanium Metals Corporation has announced a new \$14 million expansion programme of rolling and finishing facilities at its Toronto (Ohio) plant for the production of wide thin-gauge titanium sheet and strips.

Production of titanium sponge by the non-Communist world in 1961 is estimated to have been 9,900 short tons, compared with 9,200 short tons in 1960. Producing countries were: United States, 6,100 short tons; Japan, 2,500 short tons; and United Kingdom, 1,300 short tons.

TUNGSTEN

Domestic production of tungsten concentrates for the first nine months of 1961 was 1,640 tons, consisting of 727 tons of scheelite concentrates, and 913 tons of wolfram concentrates. Scheelite output was all from King Island, and increased from 234 tons for the corresponding period of 1960. Wolfram production, which consisted of 879 tons from Tasmania, 32 tons from the Northern Territory, and 2 tons from Queensland, was at about the same level as in the corresponding period of 1960.

Exports of scheelite concentrates for the first three quarters of 1961 were 680 tons, valued at £332,517. During the same period exports of wolfram concentrates were 832 tons valued at £479,670.

The price of tungsten ore in the United Kingdom reached its nadir for 1961 early in December, when it was quoted at stg.89/- - 92/- per long ton unit c.i.f. Europe for 65 percent WO₃ ore. Even under the pressure of Russian and East European sales, positive action by both buyers and sellers prevented a further downward movement. Since December tungsten prices have risen somewhat and on 1st March, 1962, the United Kingdom price was stg.99/- - 108/- per long ton unit.

One factor which has led to the recent upward trend in price is the fact that ferro-tungsten users tended to let stocks run down late last year. Buying by these consumers, combined with a recent scarcity of spot supplies of Russian, Chinese and East European ore has brought about the market improvement. However, there does not appear to be any evidence at present to suggest any substantial rise in price in the immediate future.

URANIUM

During 1961, domestic production of uranium oxide (exclusive of production in South Australia, data for which are not available) is estimated to have been 1,100 tons. Of this total, Mary Kathleen Uranium Ltd. (Queensland) accounted for 860 tons, the balance being produced in the Northern Territory from plants at Rum Jungle and in the South Alligator River area.

Because of diminished ore reserves and lack of markets, the uranium mine at Radium Hill (South Australia) was closed down in December, 1961. The plant at Port Pirie which treated concentrates from Radium Hill was scheduled to cease production of uranium oxide late in February, 1962.

In the South Alligator River area (Northern Territory) South Alligator Uranium N.L. has suspended mining operations, having produced sufficient ore to satisfy its 1962 concentrate quota for the United Kingdom Atomic Energy Authority, thereby completing the company's contract. In addition, a considerable quantity of high-grade ore has been stockpiled. The company's plant has been put on a caretaker basis for the time being.

United Uranium N.L. recommenced milling operations at its Moline plant in January, 1962. The company has announced that known ore reserves will be heavily depleted to meet the 1962 delivery quota of concentrates to the United Kingdom Atomic Energy Authority; the company's contract expires in 1965-66. Exploratory work is being carried out in an endeavour to prove additional reserves of ore sufficient to complete the contract.

Production of uranium oxide at the Rum Jungle plant for shipment to the Combined Development Agency continues to be from stockpiled ore. The contract with C.D.A. is due to expire in January, 1963. At Rum Jungle Creek South removal of overburden is well advanced and full-scale extraction of ore is due to commence in April, 1962. No decision regarding the treatment of this ore has been announced, but reserves are such as to keep the present Rum Jungle plant in operation for five years after the present stockpiled ore is exhausted.

If the present rate of production at Mary Kathleen is maintained the company's contract with the United Kingdom Atomic Energy Authority should be completed early in 1964.

Overseas, the United States Atomic Energy Commission has announced that production of uranium concentrates in the United States during 1961 is estimated to have been 17,356 short tons, the average price for which was \$8.31 per pound. This is about 250 short tons less than the 1960 production which averaged \$8.64 per pound in price.

ZINC

Mine production of zinc in Australia in 1961 was 288,200 tons compared with 290,200 tons in 1960 and the record of 291,600 tons achieved in 1957. Had it not been for the loss of production at Mt. Isa due to the dispute in the final quarter of the year a new production record would have been established.

Production of refined zinc in 1961 reached a new record level of 138,700 tons, an increase of 18,000 tons above production in 1960. Production at Risdon (Tasmania) was higher, although output was cut by the equivalent of an annual rate of 7,000 tons later in the year; at Cockle Creek (New South Wales) production of g.o.b. zinc from the new smelter became available. During the year a proportion of the Risdon production (electrolytic) was debased and it is likely that in future a substantial quantity of debased metal will be sold from this centre.

During the year 118,000 tons of zinc concentrates (zinc content) were shipped overseas. Total shipments of metal during the year were 42,600 tons compared with 27,400 tons in 1960. The increase in exports reflects in part a downturn in domestic consumption in 1961. Actual domestic shipments for the year were 85,600 tons compared with 90,300 tons in 1960.

The domestic price of zinc in Australia (99.95%) has been unchanged at £100 per ton f.o.b. Risdon since June, 1961. On the London Metal Exchange the price has maintained an almost consistent downward trend since March, 1961, when the average price for the month was £84.7 per ton; the average price for December was £87.15 per ton, and for February, 1962, £89.8 per ton. In the United States, the statistical position has been somewhat stronger and the price was advanced from 11.50 cents per pound to 12.00 cents per pound on 1st December, at which level it was unchanged at the end of February, 1962.

Following a disappointing level of consumption in the United States in the early months of 1961, the situation improved during the second quarter; shipments from smelters substantially increased and were maintained at a very high level for the remainder of the year. Actual domestic shipments as reported by the American Zinc Institute were 872,867 short tons, a level which has only been exceeded in one previous year. Although there was some increase in United States production, total shipments both domestic and overseas were such that over the year stocks held by producers fell by approximately 40,000 tons and by 70,000 tons compared with the peak recorded at the end of March, 1961.

Outside the United States producers' stocks at the end of 1961 were somewhat higher than at the end of 1960 but the peak was reached in August and in subsequent months the overall level of stocks fell.

Particularly important in 1961 was the substantial increase in exports of zinc from the U.S.S.R. to the West, particularly to the United Kingdom, and the very marked increase in stocks held in approved London Metal Exchange warehouses. With the consumption in the United Kingdom at somewhat lower levels than in 1960, this localised stock accumulation had an influence on the London price.

No action was taken with respect to zinc at the third and fourth sessions of the International Lead & Zinc Study Group held in 1961. The fifth session, held at Geneva in March, 1962, was adjourned till 28th May, 1962.

ZIRCONIUM

During the third quarter of 1961 production of zircon concentrates from the east coast was 31,159 tons. In addition, 1,017 tons of zircon concentrates were shipped from Western Australia during the quarter. Production of zircon concentrates from the east coast for the period January-September, 1961, was 96,000 tons. Exports of zircon concentrates continued at a high level during the September quarter of 1961 and amounted to 33,368 tons, valued at £414,674 f.o.b.; exports of zircon concentrates for the January-September period were 106,809 tons valued at £1.31 million f.o.b.

Present information suggests that the level of production of zircon concentrates will not be greatly affected by the expected increase in rutile production. For some time the production of zircon concentrates from current mining operations has been augmented by the up-grading of stockpiled material accumulated as a by-product of rutile production in previous years. It is understood that these stockpiles are now exhausted and future output of zircon concentrates will come from current production only.

METAL AND MINERAL PRICES

MONTHLY AVERAGE BASE METAL PRICES

	Aust.	U.K. Stg.	U.S.A. (a)	Aust.	U.K. Stg.	U.S.A. (a)
COPPER			LEAD			
December	£305/-	£229/18/8	31.00	£95/-	£66/9/5	10.25
January	£305/-	£230/9/-	31.00	£94/1/10	£59/2/1	9.75
February	£305/-	£235/0/8	31.00	£85/-	£58/13/7	9.58
ZINC			TIN			
December	£100/-	£71/7/3	12.00	£1,246/-	£949/5/-	121.01
January	£100/-	£70/4/3	12.00	£1,237/7/7	£846/12/11	120.31
February	£100/-	£68/15/8	12.00	£1,232/14/-	£951/10/9	121.08

MAXIMUM & MINIMUM SPOT METAL PRICES, 1st DECEMBER, 1961 - 28th FEBRUARY, 1962

	Max.	Min.	Max.	Min.	Max.	Min.
Australia		U.K. Stg.		U.S.A. (a)		
Copper	£305/-	£305/-	£236/17/6	£228/2/6	31.00	31.00
Lead	£95/-	£85/-	£61/1/3	£56/18/9	10.25	9.50
Zinc	£100/-	£100/-	£72/5/-	£67/18/9	12.00	12.00
Tin	£1,256/-	£1,225/-	£956/10/-	£936/10/-	122.25	119.50

METAL PRICES AS AT 1st MARCH, 1962

	Australia	U.K. Stg.	U.S.A. (a)
Aluminium	(d) £225/18/- per ton (e) £271 per ton	£180 per ton	24.00 (f) 23.25
Antimony	(i) £295 per ton	(i) £237½ per ton	(j) 32.50
Bismuth	£1/10/3 per lb.	16/- per ton	\$2.25
Cadmium	14/3 per lb.	12/3 per lb.	\$1.65
Cobalt	—	12/- per lb.	\$1.50
Copper	(b) £305 per ton	£234/12/6	(c) 31.00
Gold, per fine oz.	£15/12/6	£12/9/3½ per ton	\$35.0
Lead	£85 per ton	£59/11/3 per ton	9.50
Mercury	—	£61½ per flask	\$192-\$195 per flask, domestic, f.o.b.
Nickel	7/9½ per lb. lots over 1 ton 7/11½ per lb. lots over 5 cwt. and under 1 ton 8/2 per lb. lots under 5 cwt.	£660 per ton	(g) 82.50
Pig Iron	(k) £21/3/- per ton	(l) £21/9/3 per ton	\$66 per ton
Platinum, per fine oz.	—	U.K. and Empire refined £30½ Imported £27½-£28	\$80-\$85
Silver, per fine oz.	9/0½	7/2½	101.50 cents
Tin	(h) £1,234 per ton	£952/5/- per ton	121.25
Zinc	£100 per ton (electro)	£69/1/3 per ton (g.o.b.)	12.00 (Prime Western)

(a) Cents per lb. unless otherwise stated. (b) Price ex smelters, Port Kembla. (c) Domestic. (d) Imported, c.i.f. (e) Domestic 1-20K ingots, 99.5% c.i.f. capital cities. (f) Canadian price f.o.b. Toronto. (g) Canadian price f.o.b. Port Colborne. (h) 5 ton lots, delivered Sydney. (i) 99.6% Sb. (j) 99.5% Sb, f.o.b. Laredo. (k) Domestic basic price. (l) Plus 1 per cent.

ORE AND CONCENTRATE PRICES AT 1st MARCH, 1962

	Australia	U.K. Stg.	U.S.A.
Antimony	Nom.	26/- - 28/- per unit 60% Sb.	Nom. per s. ton unit 60% \$4.00 - \$4.25, 65% lump \$4.30 - \$4.50.
Beryl	£15/10/- per unit BeO, f.o.b. nominated stores in Capital Cities.	230/- - 240/- per unit f.o.b. min. 10% BeO.	Domestic, f.o.b. mine or mill \$46-\$48 per s.t.u.; imported, spot, c.i.f. U.S. ports \$32-\$33 nom.
Bismuth	—	8/6 per lb. c.i.f. metal content 65% concen- trate.	—
Chromium Ore	Nom.	£15/5/- per ton, 48% metallurgical ore c.i.f., 3:1 ratio.	Rhodesian ore 48% Cr ₂ O ₃ long ton, f.o.b., cars New York, 3:1 ratio, \$35.75-\$36.25 (nom.), 48% Cr ₂ O ₃ , no ratio, \$27-\$28 (nom.).
Columbite	—	65% combined oxides, high grade c.i.f., 155/- - 160/- per unit	\$1.10 - \$1.25 per lb. pentoxide, 10:1 ratio.
Manganese	Metallurgical ore £12 per ton f.o.b. Geraldton. Battery grade £30 per ton f.o.b., N.S.W. rail- way siding for 75% MnO ₂ . Queensland ore, battery grade, 75-80%, £35 per ton c. & f. Syd- ney.	5/6 - 5/9 per unit, 46% ore, c.i.f. European ports.	\$87-\$90 per long ton unit nom. 46-48% ore, c.i.f. U.S. ports, import duty extra.
Molybdenum Ore	Nom.	10/- per lb. metal, contained in 85% MoS ₂ , f.o.b. Climax, Colorado.	\$1.40 per lb. contained Mo, f.o.b. mines.
Rutile	£30-£32 per ton, f.o.b. nom.	£32/- per ton c.i.f., 95-97% TiO ₂ cons.	\$80 per s. ton of 94% TiO ₂ for delivery within 12 months (nom.).
Ilmenite	£3/17/6 - £4 per ton, f.o.b. nom. (52% - 54%).	£7-7½ per ton 52-54% TiO ₂ , c.i.f.	\$23.00-\$26.00 per ton, 59.5% TiO ₂ , f.o.b. Atlantic (E. & M. J.).
Tantalite	Nom.	£85-90 per unit, 60% Ta ₂ O ₅ , c.i.f.	—
Tin	£10½ - £10½ per unit of metal delivered Sydney.	—	—
Tungsten	124/- - 135/- per unit	99/- - 108/- per unit, c.i.f. Europe.	\$13.30 - \$14.00 s.t.u., foreign duty \$7.93 extra.
Zircon	£11 - £13 per ton 66-67% ZrO ₂ cons.	£15 - £16½ per ton, 66- 67% ZrO ₂ cons. c.i.f.	\$50 per long ton, 65% ZrO ₂ cons.

Note: Some Australian ore prices are nominal and are subject to negotiation between the producer and purchaser.

The ore and concentrate prices quoted above will vary according to grade and, in many cases, to the size of the ore parcel.

Copper Ore.

Australia: The price paid for ores is related to the market price of copper, less charges listed below. The basis of price determination is variable; details are obtainable from individual smelters.

Company	Draughtage Deduction or Copper Content Deduction	Receiving, Sampling, Assaying & Smelting Charge per ton of ore	Converting, Refining, Realising Charge per unit of copper paid for	Gold Refining Charge per oz. of gold paid for	Silver Refining Charge per oz. of silver paid for
E.R.S. (1)	1.3 unit of copper per ton of ore.	£7/7/6	11/6	15/-	4/5
Mt. Isa (2)	1.3 unit of copper per ton of ore.	£5/5/-	14/-	No payment for gold and silver	
Mt. Morgan (3) (4)	1% of weight of ore plus 1.3 units of copper per ton of ore.	£6/-/-	20/-	17/-	5/-

- (1) The Electrolytic Refining and Smelting Company of Australia Pty. Ltd., Port Kembla, N.S.W.
- (2) Mt. Isa Mines Ltd., Mt. Isa, Queensland.
- (3) Mt. Morgan Ltd., Mt. Morgan, Queensland.
- (4) Mt. Morgan gold and silver deductions:—Gold, deductions range from 1 dwt./ton for 10 dwt./ton and lower grade ore to 1 dwt./ton plus 5% of the balance for 12 dwt./ton and over ore; silver, 1 oz./ton plus 10% of the balance.

INDUSTRIAL MINERAL PRICES AS AT 1st MARCH, 1962

Asbestos.

W.A. Crocidolite, export price, f.o.b. Fremantle.
£98-110 per short ton according to quantity.

Fluorspar.

Buying.

90% CaF₂ f.o.r. Nearest Queensland rail siding—£11/2/6 per ton.
85% CaF₂ f.o.r. Nearest Queensland rail siding—£9/17/6 per ton.
With unit variation of 2/6 from the 85% or 90% basis.

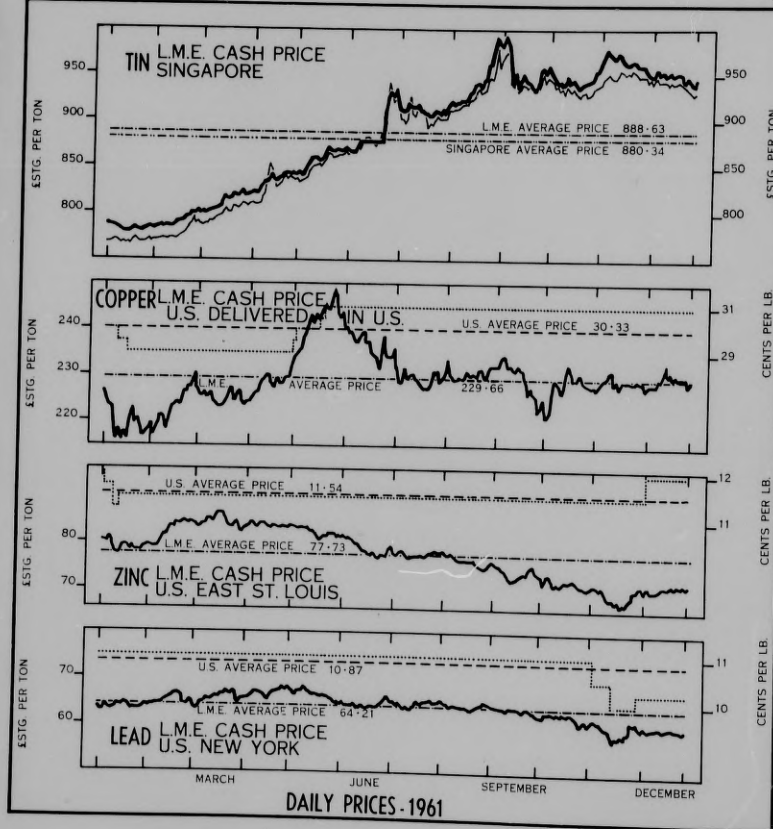
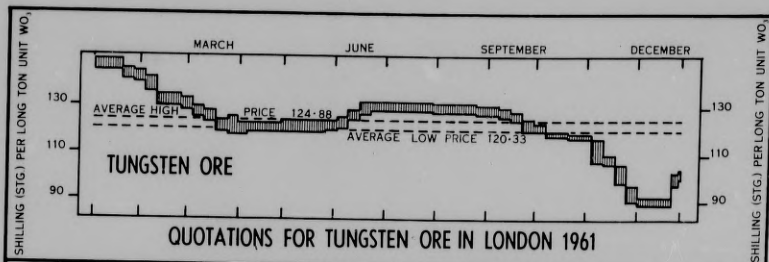
Selling.

90% CaF₂ delivered Sydney—£29/12/6 to £32/2/6 per ton.
85% CaF₂ delivered Sydney—£27/12/6 to £30/2/6 per ton.

Sillimanite.

Selling.

£8-£10 per ton f.o.r. Olary, South Australia.



Commonwealth Bureau of Census and Statistics,
Canberra, Australia

THE AUSTRALIAN MINERAL INDUSTRY

VOL. 14. No. 3

PART 2 — QUARTERLY STATISTICS

QUARTER ENDED 30th SEPTEMBER, 1961

Prepared under instructions from the Right Honourable the Treasurer
by

K. M. ARCHER
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PREFACE

Statistics included in this Part relate to Australian production of and overseas trade in minerals and mineral products. In the main, the data relating to mineral production consist of official statistics of Mines Departments of the several States and the Northern Territory Mines Branch. These statistics have been supplemented as necessary by data obtained from the Bureau of Mineral Resources, including information collected by that Bureau from mines and treatment plants.

The fundamental provision of the uniform plan evolved in 1950 for standardization of Australian mineral production statistics is that quantities and values of individual minerals produced should be reported in terms of the products in the form in which they are dispatched from the locality of each mine. This involves the inclusion in the mining industry of ore-dressing and elementary smelting of metallic minerals (e.g., in the case of gold) and miscellaneous treatment of non-metallic minerals where these operations are carried out in an associated plant at or near the mine. For example, in the case of a metal mine, the output is recorded as ore when no treatment is undertaken at the mine or as a concentrate where ore-dressing operations are carried out in associated works in the locality of the mine.

The particulars of quantities of minerals produced shown in Table 4 have been compiled on this basis as far as practicable. This has involved some re-arrangement of official statistics published by Mines Departments for certain States. Actual output of the mineral product (as defined in the preceding paragraph) has generally been reported, but in some cases it has been necessary to include dispatches from the mine (or sales) as distinct from production in deriving the total for Australia. In addition to the basic quantity data, particulars of contents of metallic minerals have been shown in detail in Tables 4 and 5 and in summary form in Table 6. In general, the particulars of content of metallic minerals represent total contents (as determined by assay) for each metal which is a "pay metal" or "refiners' prize" when present in the particular mineral. The data in Table 4 exclude construction materials (sand, gravel, building stone, etc.), and some particulars for non-metallic minerals which are not at present available. In Table 6 particulars of producing States as well as totals for Australia are shown.

Principally because of time lags in treatment of a number of important metallic minerals, it has been found impracticable, under Australian conditions, to obtain satisfactory information as to the value of minerals produced, on a quarterly basis. Statistics of (i) value of output and of production of the mining and quarrying industries (ii) value of individual minerals produced, (iii) value of imports and of exports of principal minerals and mineral products on a calendar year basis, and (iv) value of smelter and refinery production on a fiscal year basis, appear as a supplement to the first issue of this Bulletin each year.

In the presentation of the tables the following terms and symbols have been used:

ton:	long ton of 2,240 lb.	(—):	nil.
short ton:	ton of 2,000 lb.	(.):	less than half the unit shown.
unit:	22.4 lb.	(n.a.):	not available.
*	subject to revision.	(†):	estimated or partly estimated.

All tables in this publication omit particulars relating to uranium bearing minerals.

I extend my thanks to State Departments of Mines, Statisticians of the several States, and the Bureau of Mineral Resources who have supplied information used in the preparation of this Bulletin.

K. M. ARCHER,
Commonwealth Statistician

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1. SUMMARY TABLES

TABLE 1 — MINE PRODUCTION OF PRINCIPAL MINERALS: AUSTRALIA

Mineral	Unit of Quantity	1957	1958	1959	1960*	1961*	
						July-Sept.	Jan.-Sept.
Metallic contents—							
Copper	ton	59,255	75,715	94,950	109,272	25,230	78,619
Lead	"	333,753	328,347	316,293	308,179	67,940	215,694
Zinc	"	291,582	263,044	249,133	290,224	73,185	223,558
Tin	"	1,952	2,237	2,351	2,202	607	1,855
Gold	'000 f. oz.	1,084	1,104	1,085	1,086	275	785
Silver	"	15,811	16,340	15,161	15,199	3,384	10,537
Iron (a)	'000 tons	12,463	12,539	12,700	12,814	1856	12,546
Manganese ore—							
Metallurgical (Mn. content)	ton	34,904	25,623	40,966	27,991	7,837	18,432
Battery and other (MnO ₂ content)	ton	1,239	2,819	2,475	1,617	271	750
Rutile (TiO ₂ content)	"	124,863	80,955	79,624	86,009	23,362	71,123
Ilmenite (TiO ₂ content)	"	38,888	38,278	45,677	59,153	28,138	63,600
Tungsten concentrates (WO ₃ content)	ton	1,409	850	653	1,108	434	1,166
Black coal	'000 tons	19,919	20,442	20,298	22,575	6,787	17,801
Brown coal	"	10,741	11,644	13,035	14,967	4,418	12,289

(a) Excludes iron content of iron oxide not intended for metal extraction.

TABLE 2 — SMELTER AND REFINERY PRODUCTION OF PRINCIPAL METALS: AUSTRALIA

(Excludes secondary metal (i.e., metal recovered from scrap) unless otherwise specified).

Metal	Unit of Quantity	1957	1958	1959	1960*	1961*	
						July-Sept.	Jan.-Sept.
Aluminium (refined)	ton	10,624	10,869	11,370	11,655	3,418	9,563
Cadmium (refined)	"	393	353	341	300	65	225
Copper (blister) (a)	"	50,403	64,608	68,494	71,037	18,512	51,833
Copper (refined)	"	32,880	43,276	51,593	70,652	18,616	51,933
Gold (refined)	"	1,078	1,070	1,067	1,045	255	781
Australian origin	'000 f. oz.	1,250	1,207	1,209	1,188	290	896
Lead—							
Refined (b)	ton	192,161	191,474	185,805	189,823	41,443	121,519
Lead cont. of lead-silver bullion for export	ton	46,891	57,171	50,310	52,723	9,781	35,569
Total	"	239,052	248,645	236,115	242,546	51,224	157,088
Pig iron (c)	'000 tons	2,208	2,279	2,507	2,882	856	2,381
Steel ingots (c)	"	3,016	3,133	3,395	3,687	1,029	2,876
Silver (refined)	'000 f. oz.	8,011	9,101	7,805	8,085	1,651	5,337
Tin (refined)	ton	1,806	2,121	2,226	2,254	561	1,891
Zinc (refined slab) (d)	"	110,348	114,773	116,461	120,230	37,641	101,310

(a) Total production for refining in Australia and overseas. (b) Includes lead content of antimonial lead. (c) Includes recovery from scrap. (d) Includes small quantities of metal recovered from zinc dust used in works. Note: Particulars of refined aluminium, cadmium, copper, lead, silver, tin and zinc in Table 2 were collected by the Bureau of Mineral Resources.

TABLE 3 — SUMMARY OF PRODUCTION, IMPORTS AND EXPORTS OF PRINCIPAL MINERALS AND MINERAL PRODUCTS: AUSTRALIA

(Note: Particulars of production of refined metals exclude secondary metal (i.e., metal recovered from scrap) unless otherwise specified).

Particulars	1957	1958	1959	1960*	1961*	
					July-Sept.	Jan.-Sept
ALUMINIUM (Tons)						
Production—						
Bauxite (Al ₂ O ₃ content)	3,758	3,533	6,914	132,044	1441	16,700
Alumina	20,116	22,490	26,900	29,801	7,607	21,460
Refined aluminium	10,624	10,869	11,370	11,655	3,418	9,563
Imports—						
Bauxite (Al ₂ O ₃ content)	124,966	138,419	136,910	153,199	15,914	126,428
Refined aluminium (a)	8,374	14,813	19,268	26,432	1,423	13,112
Ingots	8,374	14,813	19,268	26,432	1,423	13,112
Rolled, drawn and extruded shapes (b)	2,797	2,827	2,719	6,207	298	1,585
Foil	2,193	2,409	2,788	3,909	384	1,738
Powder	531	486	670	678	84	336
Exports—						
Bauxite (Al ₂ O ₃ content)	—	—	—	113,400	15	15,322
Refined aluminium (c) —						
Ingots	762	—	78	20	—	2
Rolled, drawn and extruded shapes (b)	83	135	162	282	94	281
COPPER (Tons)						
Production—						
Copper cont. of minerals produced	59,255	75,715	94,950	109,272	25,230	78,619
Blister copper (c)	50,403	64,608	68,494	71,037	18,512	51,833
Refined copper	32,880	43,276	51,593	70,652	18,616	51,933
Imports of refined copper—						
Ingots	4,251	659	3,479	4,750	25	2,811
Rolled, drawn and extruded shapes (b)	2,031	2,289	1,189	2,445	59	594
Exports—						
Copper cont. of ores, concentrates, matte, etc.	6,873	7,272	20,095	36,210	8,121	23,287
Blister copper	19,131	14,421	16,225	502	1,022	1,022
Refined copper—						
Ingots	1	—	2,749	13,577	6,254	20,702
Rolled, drawn and extruded shapes (b)	1,216	1,365	1,011	2,051	581	1,401
GOLD (Fine oz.)						
Production—						
Gold content of minerals produced	1,083,941	1,103,980	1,085,104	1,086,014	274,549	784,783
Refined gold	1,078,419	1,069,774	1,067,129	1,045,139	255,110	780,742
Australian origin	171,970	136,998	141,624	142,526	34,697	115,302
Overseas origin	—	—	—	—	—	—
Total refined gold	1,250,389	1,206,772	1,208,753	1,187,665	289,807	896,044
Imports—						
Bullion, other crude forms	159,998	160,232	136,674	145,365	37,529	114,916
Refined gold	—	—	—	29	2	2
Exports—						
Gold content of ores and concentrates	19,561	22,453	17,941	25,598	14,723	31,206
Bullion, other crude forms	—	—	—	323	—	—
Refined gold	783,814	128,550	128,052	2,513,645	310,279	953,189
Net industrial consumption	33,028	29,135	33,938	40,972	8,720	26,618
Change in stocks of gold held in Australia (d)	+407,536	+1,084,074	+1,041,847	—1,349,130	—21,642	—111,312

(a) Includes aluminium-base alloys. (b) Excludes wire. (c) Total production for refining in Australia and overseas. (d) Excludes specie; includes gold content of change in stocks of minerals awaiting refining.

TABLE 3—SUMMARY OF PRODUCTION, IMPORTS AND EXPORTS OF
PRINCIPAL MINERALS AND MINERAL PRODUCTS: AUSTRALIA — (Continued)

Particulars	1957	1958	1959	1960*	1961*	July-Sept.	Jan.-Sept.
IRON AND STEEL (Tons)							
Production—							
Iron content of iron ore (a)	2,462,500	2,539,197	2,699,615	2,813,955	2,855,522		2,545,550
Pig iron (b)	2,208,140	2,279,282	2,506,514	2,881,951	856,419		2,381,094
Ingot steel (b)	3,015,569	3,133,081	3,395,261	3,687,183	1,028,809		2,876,023
Blooms and slabs	2,473,901	2,668,571	2,910,865	3,186,129	879,129		2,460,264
Tinplate	(c) 15,453	69,066	80,256	101,624	23,511		78,255
Imports—							
Iron content of iron ore	111,656	1162,886	1144,047	1153,176	141,608		1109,365
Ferro-alloys	14,579	13,335	23,989	41,612	18,306		44,749
Tinplate	144,199	66,059	50,348	63,741	4,485		29,356
Exports—							
Pig iron	15,330	19,321	44,038	97,847	79,225		206,557
Ingot steel	2,327	728	12,061	9,619	44,338		46,169
Tinplate	n.a.	n.a.	1,671	8,080	4,791		12,952
Scrap	178,255	156,978	182,985	205,747	55,472		174,661

LEAD (Tons)

Production—						
Lead content of minerals produced	333,753	328,347	316,293	308,179	67,940	215,694
Smelter production—						
Refined lead (d)	192,161	191,474	185,805	189,823	41,443	121,519
Lead content of lead-silver bullion for export	46,891	57,171	50,310	52,723	9,781	35,569
Total lead cont.	239,052	248,645	236,115	242,546	51,224	157,088
Exports—						
Lead content of ores, concentrates, etc.	70,736	64,606	67,692	54,927	18,013	49,195
Lead content of lead-silver bullion	47,241	57,661	52,650	49,305	11,260	38,608
Refined lead—						
Pigs	160,589	155,730	138,448	125,265	30,204	93,350
Rolls and extruded shapes (except wire, leaf and foil)	182	99	86	93	12	49
Antimonial lead	345	109	597	503	20	282
Scrap	8,372	5,152	1,390	891	5	100

MANGANESE ORE (Tons)

Production—						
Metallurgical grade ore	75,214	55,536	86,556	58,433	16,289	38,116
Battery (incl. other) grade ore	1,796	4,147	3,415	2,354	368	1,070
Imports—						
Metallurgical grade ore	—	5	3	51	73	150
Battery grade ore	2,049	1,183	1,304	177	1,030	2,347
Exports—						
All grades of ore	30,061	18,399	31,812	45,639	6,452	27,701

(a) Excludes iron content of iron oxide not intended for metal extraction. (b) Includes recovery from scrap. (c) Production commenced August. (d) Includes lead content of antimonial lead.

TABLE 3—SUMMARY OF PRODUCTION, IMPORTS AND EXPORTS OF
PRINCIPAL MINERALS AND MINERAL PRODUCTS: AUSTRALIA — (Continued)

Particulars	1957	1958	1959	1960*	1961*	
					July-Sept.	Jan-Sept
SILVER ('000 fine oz.)						
Production—						
Silver content of minerals produced	15,789	16,305	15,161	15,199	3,384	10,537
Refined silver	8,011	9,101	7,805	8,085	1,651	5,337
Imports—						
Bullion and other crude forms	77	75	78	69	18	58
Exports—						
Silver content of ores and concentrates	2,477	2,564	2,366	2,429	867	2,283
Silver content of lead-silver bullion produced for export	4,098	4,696	4,242	3,972	907	3,110
Refined silver	3,672	4,876	3,001	2,800	231	819
Unrefined bullion & matte	12	—	—	—	—	—

TIN (Tons)

Production—						
Tin content of minerals produced	1,952	2,237	2,351	2,202	607	1,855
Refined tin	1,806	2,121	2,226	2,254	561	1,891
Imports—						
Refined tin, excl. leaf and foil	1,218	1,070	1,294	1,708	243	698
Exports—						
Tin content of ores, concentrates, etc.	134	29	43	2	16	154
Refined tin, excl. leaf and foil	21	11	9	14	1	1

TITANIUM (in terms of TiO₂) (Tons)

Ilmenite						
Production	38,888	38,278	45,677	59,153	28,138	63,600
Exports	120,665	130,717	137,468	141,463	121,790	148,639
Rutile						
Production	124,863	80,955	79,624	86,009	23,362	71,123
Exports	115,321	173,462	178,688	191,082	123,213	170,770

TUNGSTEN (WO₃ content) (Tons)

Scheelite						
Production	950	478	—	291	213	506
Exports	907	341	103	351	191	521
Wolfram						
Production	459	372	653	817	221	660
Exports	454	319	717	655	150	621

ZINC (Tons)

Production —						
Zinc content of minerals produced	291,582	263,044	249,133	290,224	73,185	223,558
Refined slab zinc (a)	110,348	114,773	116,461	120,230	37,641	101,310
Exports—						
Zinc content of ores, concentrates, etc.	178,078	146,234	114,124	178,091	39,040	119,969
Refined zinc—						
Ingot and other refinery shapes	37,092	37,938	41,606	27,443	14,122	32,781
Plates, sheets, circles and strips	1,561	1,090	1,096	1,148	433	975
Scrap	414	269	344	1,183	166	548

(a) Includes small quantities of metal recovered from zinc dust used in works.

TABLE 3—SUMMARY OF PRODUCTION, IMPORTS AND EXPORTS OF PRINCIPAL MINERALS AND MINERAL PRODUCTS: AUSTRALIA — (Continued)

Particulars	1957	1958	1959	1960*	1961*	
					July-Sept.	Jan-Sept
COAL ('000 Tons)						
Production—						
Black coal—						
Semi-anthracite	71	57	54	47	17	43
Bituminous	18,229	18,616	18,576	20,660	6,204	16,375
Sub-bituminous	1,619	1,769	1,668	1,868	566	1,383
Total black coal	19,919	20,442	20,298	22,575	6,787	17,801
Underground	17,888	18,377	18,593	20,420	5,943	15,829
Open cut	2,031	2,065	1,705	2,155	844	1,972
Brown coal (lignite)	10,741	11,644	13,035	14,967	4,418	12,289
Imports—						
Coal	9	6	8	5	1	7
Coke (incl. petroleum coke)	15	9	7	12	..	..
Exports—						
Coal	759	824	794	1,811	776	1,754
Coke	182	52	21	95	30	82

SULPHURIC ACID AND SULPHUR (Tons)

Production of sulphuric acid (mono-tons)	971,976	1,009,064	1,000,458	1,109,751	273,738	891,419
Sulphur in sulphuric acid (mono-) from—						
Sulphur (elemental) ..	156,413	162,881	153,195	179,752	42,256	150,935
Zinc concentrate	35,025	38,524	39,933	42,946	13,281	36,577
Lead concentrate	18,272	21,339	19,619	21,573	5,912	16,568
Pyrite	100,111	99,216	103,596	104,406	24,832	77,422
Spent oxide	4,744	4,301	3,655	3,814	461	2,049
Other materials	3,271	3,702	7,151	10,396	2,770	7,943
Total sulphur cont.	317,836	329,963	327,149	362,887	89,512	291,494
Imports—						
Sulphur (elemental)	120,277	202,421	170,770	221,778	46,431	146,253

ASBESTOS (Short tons of 2,000 lb.)

Production—						
Chrysotile	2,232	2,255	1,433	1,141	363	724
Crocidolite	12,438	13,313	16,442	14,472	4,444	10,690
Imports—						
Chrysotile	22,873	23,408	24,316	28,832	7,230	21,554
Crocidolite	165	311	328	74	38	74
Amosite	10,322	13,984	12,019	10,308	2,088	6,224
Other	528	1,185	1,667	1,958	167	694
Exports—						
Chrysotile	378	264	197	25	—	6
Crocidolite	10,892	10,049	12,684	8,177	2,321	5,549
Other	59	120	93	97	10	49

II. DETAILED TABLES

TABLE 4—QUANTITIES AND CONTENTS (OR GRADE) OF MINERALS PRODUCED: AUSTRALIA

Mineral	Unit of Quantity	1961*				July-Sept.	Jan.-Sept.
		1957	1958	1959	1960*		
METALLIC MINERALS							
Antimony ore	ton	66	54	3	6	1	3
Antimony content	"	39	31	3	3	..	..
Antimony concentrate	"	786	1,062	1,019	250	..	114
Antimony content	"	446	661	626	151	..	69
Bauxite	"	7,707	6,909	14,985	70,881	929	12,951
Al ₂ O ₃ content	"	3,758	3,533	6,914	132,044	441	16,700
Beryllium ore	"	395	247	317	190	91	240
BeO content	unit	4,570	2,900	3,587	2,221	1,043	2,728
Bismuth concentrate	lb.	—	3,310	—	—	—	—
Bismuth content	"	—	2,328	—	—	—	—
Chromite	ton	3,049	776	120	529	—	—
Cr ₂ O ₃ content	"	11,420	1386	160	1,555	—	—
Copper ore (a)	"	56,447	58,109	77,738	68,321	17,350	54,365
Copper content	"	3,666	3,897	4,420	3,702	1,066	2,887
Gold content	f. oz.	1	37	2	49	107	107
Silver content	"	122	1,037	198	64	2,399	5,348
Copper concentrate	ton	222,168	279,976	358,774	433,270	97,478	306,200
Copper content	"	50,047	66,219	85,165	100,509	23,024	71,543
Gold content	f. oz.	71,202	77,506	97,660	87,965	23,940	63,290
Silver content	"	360,266	411,304	579,004	694,752	188,075	561,734
Copper precipitate	ton	557	1,536	1,379	1,290	116	3,804
Copper content	"	406	998	935	910	82	1,058
Gold content	f. oz.	—	310	—	—	—	—
Silver content	"	—	38	—	—	—	31
Gold ore	ton	10	—	—	—	—	—
Gold content	f. oz.	36	—	—	—	—	—
Gold concentrate	ton	949	1,855	1,487	73	58	58
Gold content	f. oz.	1,917	4,109	3,534	265	464	464
Silver content	"	356	492	4	303	567	567
Copper content	ton	..	..	..	5	10	10
Gold other forms (b)	oz.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Gold content	f. oz.	986,677	995,925	959,413	971,890	242,544	700,287
Silver content	"	193,319	196,778	194,601	206,935	37,528	135,676
Ilmenite concentrate	ton	71,155	69,948	83,577	107,229	51,128	115,057
TiO ₂ content	"	38,888	38,278	45,677	59,153	28,138	63,600
Iron ore (c)	"	3,800,823	3,917,424	4,140,693	4,355,464	1,341,624	3,955,284
Iron content	"	12,462,500	12,539,197	12,699,615	12,813,955	1855,522	12,545,550
Iron oxide	"	..	..	..	..	..	..
For gas purification	ton	5,338	2,864	4,355	2,742	146	1,193
For cement manufacture	ton	9,759	6,093	9,485	16,004	—	5,388
For coal washing	"	4	25	30	15	—	15
For fluxing	"	4,650	8,100	9,600	9,600	12,000	16,000
Lead ore (d)	"	20,758	21,854	12,693	18,533	3,416	11,766
Lead content	"	3,145	2,301	1,115	1,319	201	736
Zinc content	"	—	20	—	—	—	..
Silver content	f. oz.	393,896	94,757	36,611	53,917	12,322	30,117
Gold content	"	—	15	—	—	—	—
Lead concentrate	ton	497,404	492,908	461,055	449,596	96,068	309,171
Lead content	"	320,319	316,048	306,395	297,865	65,057	207,334
Silver content	f. oz.	13,475,649	14,200,130	13,073,288	12,861,275	2,759,248	8,671,386
Gold content	"	10,675	11,590	12,065	11,076	2,668	8,246
Antimony content	ton	724	664	652	632	137	442
Cadmium content	"	76	74	72	68	13	43
Copper content	"	3,770	3,270	3,320	2,810	670	2,025
Sulphur content	"	54,888	51,939	50,468	49,102	11,196	34,836
Lead-copper concentrate	"	7,366	7,630	6,010	6,797	2,195	6,056
Lead content	"	2,719	2,843	2,521	2,204	740	2,028
Copper content	"	633	666	487	598	193	534
Silver content	f. oz.	689,373	761,360	671,412	716,940	202,818	595,681
Gold content	"	10,123	10,001	8,436	10,978	3,726	9,129
Sulphur content	ton	1,031	1,068	841	952	585	1,026
Lithium	"	—	—	—	15	—	—
Lithium Oxide content	"	—	—	—	1	—	—

(a) Includes cupreous ore for fertilizer. (b) Bullion, alluvial, retorted gold, etc. (c) Iron oxide for metal extraction. (d) Includes lead-silver and lead-zinc ores.

TABLE 4—QUANTITIES AND CONTENTS (OR GRADE) OF MINERALS PRODUCED:
AUSTRALIA—(Continued)

Mineral	Unit of Quantity	1957	1958	1959	1960*	1961*	
						July-Sept.	Jan.-Sept.
METALLIC MINERALS—(Continued)							
Manganese ore—							
Metallurgical grade	ton	75,214	55,536	86,556	58,433	16,289	38,116
Manganese content	"	34,904	25,623	40,966	27,991	7,837	18,432
Battery grade	"	767	974	1,409	849	323	731
MnO ₂ content	"	571	706	1,060	625	236	624
Other grades	"	1,029	3,173	2,006	1,505	45	339
MnO ₂ content	"	668	2,113	1,415	992	35	226
Molybdenite concentrate	lb.	6,160	10,080	—	—	672	672
MoS ₂ content	"	15,236	18,568	—	—	1576	1576
Monazite concentrate	ton	141	454	358	362	19	1,363
Monazite content	"	132	423	331	345	18	1,290
Osmiridium, native	oz.	67	42	3	—	—	—
Platinum concentrate	"	26	28	—	7	—	—
Platinum content	"	17	22	—	4	—	—
Osmiridium content	"	2	1	—	—	—	—
Gold content	f. oz.	1	—	—	—	—	—
Pyrite concentrate	ton	229,125	226,744	223,004	238,630	65,002	178,736
Sulphur content	"	109,026	108,635	106,881	114,549	31,064	85,612
Gold content	f. oz.	(a)	(a)	(a)	(a)	(a)	(a)
Rutile concentrate	ton	128,903	83,328	81,905	88,630	24,131	73,396
TiO ₂ content	"	124,863	80,955	79,624	86,009	23,362	71,123
Silver ore	ton	21	19	25	15	—	—
Silver content	f. oz.	22,498	35,242	29,175	16,919	—	—
Tantalite-columbite concentrate	lb.	50,038	13,507	18,950	23,679	11,625	28,245
Ta ₂ O ₅ + Nb ₂ O ₅ content	"	23,499	6,736	8,499	11,500	5,032	11,323
Tin concentrate	ton	2,867	3,128	3,304	3,102	861	2,618
Tin content	"	1,952	2,237	2,351	2,202	607	1,855
Tungsten concentrates—							
Scheelite	ton	1,449	733	1	420	308	727
WO ₃ content	"	950	478	—	291	213	506
Wolfram	"	656	517	903	1,123	306	913
WO ₃ content	"	459	372	653	817	221	660
Zinc ore, for fertilizer	ton	—	—	—	219	—	—
Zinc content	"	—	—	—	35	—	—
Zinc concentrate	"	556,763	503,752	473,276	549,000	138,399	421,809
Zinc content	"	291,582	263,024	249,133	290,189	73,185	223,558
Lead content	"	7,570	7,155	6,262	6,791	1,942	5,596
Silver content	f. oz.	675,650	638,674	576,338	647,818	180,910	536,715
Gold content	"	3,309	4,487	3,994	3,840	1,158	3,260
Cadmium content	ton	903	798	788	881	219	647
Cobalt content	"	68	71	60	65	17	48
Copper content	"	726	665	623	738	185	562
Manganese content	"	5,858	5,680	5,763	5,379	1,079	3,523
Sulphur content	"	177,529	160,976	152,355	175,397	44,617	134,976
Zircon concentrate	"	18,561	59,269	113,356	102,129	32,176	102,206
Zircon content	"	17,703	58,745	112,352	101,264	31,699	100,735

FUEL MINERALS

Black coal—							
Semi-anthracite	'000 tons	71	57	54	47	17	43
Bituminous	"	18,229	18,616	18,576	20,660	6,204	16,375
Sub-bituminous	"	1,619	1,769	1,668	1,868	566	1,383
Total black coal	"	19,919	20,442	20,298	22,575	6,787	17,801
Brown coal (lignite)	"	10,741	11,644	13,035	14,967	4,418	12,289

(a) Included with gold—other forms.

TABLE 4—QUANTITIES AND CONTENTS (OR GRADE) OF MINERALS PRODUCED:
AUSTRALIA—(Continued)

Mineral	Unit of Quantity						1961*	
		1957	1958	1959	1960*	July-Sept.	Jan.-Sept.	
NON-METALLIC (Excluding Fuel) MINERALS								
Asbestos—								
Chrysotile, fibre and fines	short ton	2,232	2,255	1,433	1,141	363	724	
Crocidolite, fibre	"	12,438	13,313	16,442	14,472	4,444	10,690	
Barite	ton	9,778	6,802	6,214	11,417	4,638	15,396	
Clays—								
Bentonite	ton	742	37	133	382	17	587	
Bentonitic clay	"	187	116	152	190	—	—	
Brick clay and shale	"	†3,531,140	†3,829,263	†4,298,605	†4,669,186	†1,105,670	†3,178,472	
Cement clay and shale (a)	ton	141,433	149,745	172,946	208,729	n.a.	n.a.	
Damouritic clay	"	650	482	491	559	n.a.	n.a.	
Fireclay, n.e.i.	"	179,394	160,308	175,202	157,297	n.a.	n.a.	
Fuller's earth	"	215	120	136	90	n.a.	n.a.	
Kaolin (incl. ball clay)	"	43,486	37,099	36,974	48,195	n.a.	n.a.	
Stoneware clay	"	111,999	119,680	101,186	128,825	n.a.	n.a.	
Tile clay (a)	"	145,386	143,780	143,150	125,326	n.a.	n.a.	
Other clays (a)	"	124,678	163,514	192,265	210,399	n.a.	n.a.	
Diamonds, industrial	carat	312	158	37	6	n.a.	n.a.	
Diatomite	ton	6,221	4,240	5,089	4,659	—	—	
Dolomite	"	192,103	138,832	160,084	190,868	55,672	148,293	
Felspar (inc. Cornish stone)	ton	8,819	7,016	6,750	8,414	1,964	5,206	
Fluorspar (fluorite)	"	700	930	471	7	n.a.	n.a.	
Average grade	% CaF ₂	85	85	85	85	n.a.	n.a.	
Garnet concentrate	ton	70	36	65	97	18	51	
Gems—								
Opal	Value £A	184,949	216,266	446,020	637,396	n.a.	n.a.	
Sapphire	"	20	1,813	2,792	5,311	n.a.	n.a.	
Glaucophane	ton	126	112	102	111	n.a.	n.a.	
Gypsum	"	478,436	504,938	516,791	580,878	168,876	476,610	
Limestone (incl. shell & coral)	'000 tons	4,572	5,324	5,305	5,677	1,565	4,519	
Loam, for foundry moulding (a)	ton	16,967	21,505	15,410	16,206	n.a.	n.a.	
Magnesite, crude	"	83,473	69,391	60,586	62,166	29,873	77,018	
Mica, muscovite—								
Trimmed	lb.	36,713	42,479	44,665	9,500	—	—	
Crude and film	"	—	35,840	170,000	—	185,920	185,920	
Scrap	"	40,600	37,408	7,000	653,600	—	—	
Mineral pigments—								
Red ochre	ton	60	252	163	150	17	75	
Yellow ochre	"	47	31	15	15	—	—	
Pebbles, for grinding	"	746	970	900	671	n.a.	n.a.	
Perlite	"	—	300	708	796	n.a.	n.a.	

(a) Incomplete; figures relate only to production reported by Mines Departments.

**TABLE 4—QUANTITIES AND CONTENTS (OR GRADE) OF MINERALS
PRODUCED: AUSTRALIA—(Continued)**

Mineral	Unit of Quantity	1961*					
		1957	1958	1959	1960*	July-Sept.	Jan.-Sept.
NON-METALLIC (Excluding Fuel) MINERALS—(Continued)							
Petalite	ton	—	68	—	—	34	84
Li ₂ O content	unit	—	285	—	—	145	359
Phosphate rock	ton	11,430	7,421	4,775	2,321	n.a.	n.a.
Pyrophyllite	"	358	267	347	501	228	574
Salt	"	427,600	429,534	455,632	467,372	n.a.	n.a.
Serpentine, for refrac- tories	ton	781	965	920	1,057	303	757
Silica (glass, chemical, etc.) (a)	ton	149,339	145,483	154,778	210,050	n.a.	n.a.
Sillimanite	"	2,302	1,696	3,633	1,524	355	1,000
Slate, for filler	"	105	15	—	—	—	—
Talc (incl. steatite)	"	14,441	15,393	16,376	15,670	4,022	11,118

(a) Incomplete; figures relate only to production reported by Mines Departments.

TABLE 5—CONTENTS OF METALLIC MINERALS PRODUCED: AUSTRALIA

Mineral in which contained	Contents of Metallic Minerals Produced					
	1957	1958	1959	1960*	1961*	
					July-Sept.	Jan.-Sept.
ALUMINA (Al₂O₃) (Tons)						
Bauxite	3,758	3,533	6,914	†32,044	441	†6,700

ANTIMONY (Tons)

Antimony ore	39	31	2	3	..	..
Antimony concentrate	446	661	626	151	—	69
Lead concentrate	724	664	652	632	137	442
Total	1,209	1,356	1,280	786	137	511

BERYLLIUM OXIDE (BeO) (Units of 22.4 lb.)

Beryllium ore	4,570	2,900	3,587	2,221	1,043	2,728
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**TABLE 5—CONTENTS OF METALLIC MINERALS PRODUCED: AUSTRALIA—
(Continued)**

Mineral in which contained	Contents of Metallic Minerals Produced					
	1957	1958	1959	1960*	1961*	
					July-Sept.	Jan.-Sept.
BISMUTH (lb.)						
Bismuth concentrate	—	2,328	—	—	—	496
Wolfram concentrate	1,344	—	—	—	—	—
Total	1,344	2,328	—	—	—	496
CADMIUM (Tons)						
Lead concentrate	76	74	72	68	13	43
Zinc concentrate	903	798	788	881	219	647
Total	979	872	860	949	232	690
CHROMIC OXIDE (Cr₂O₃) (Tons)						
Chromite	†1,420	†386	†60	†265	—	—
COBALT (Tons)						
Zinc concentrate	68	71	60	65	17	48
COPPER (Tons)						
Copper ore (a)	3,666	3,897	4,420	3,702	1,066	2,887
Copper concentrate	50,047	66,219	85,165	100,509	23,024	71,543
Copper precipitate	406	998	935	910	82	1,058
Gold concentrate	—	—	—	5	10	10
Lead concentrate	3,770	3,270	3,320	2,810	670	2,025
Lead-copper concentrate	633	666	487	598	193	534
Tin concentrate	7	—	—	—	—	—
Zinc concentrate	726	665	623	738	185	562
Total	59,255	75,715	94,950	109,272	25,230	78,619
GOLD (Fine oz.)						
Copper ore	1	37	2	—	49	107
Copper concentrate	71,202	77,506	97,660	87,965	23,940	63,290
Copper precipitate	—	310	—	—	—	—
Gold ore	36	4,109	3,534	265	464	464
Gold concentrate	1,917	995,925	959,413	971,890	242,544	700,287
Gold—other forms (b)	986,677	—	15	—	—	—
Lead ore (c)	—	—	—	—	—	—
Lead concentrate	10,675	11,590	12,065	11,076	2,668	8,246
Lead-copper concentrate	10,123	10,001	8,436	10,978	3,726	9,129
Platinum concentrate	1	—	—	—	—	—
Pyrite concentrate	(d)	(d)	—	(d)	(d)	(d)
Zinc concentrate	3,309	4,487	3,994	3,840	1,158	3,260
Total	1,083,941	1,103,980	1,085,104	1,086,014	274,549	784,783

(a) Includes cupreous ore for fertilizer. (b) Bullion, alluvial, retorted gold, etc. (c) Includes lead-silver ore. (d) Included with gold—other forms.

TABLE 5 — CONTENTS OF METALLIC MINERALS PRODUCED: AUSTRALIA — (Continued)

Mineral in which contained	Contents of Metallic Minerals Produced				
	1957	1958	1959	1960*	1961* July-Sept. Jan.-Sept
IRON (Tons) (a)					
Iron Ore	†2,462,500	†2,539,197	†2,699,615	†2,813,955	†855,522 †2,545,550
LEAD (Tons)					
Lead ore (b)	3,145	2,301	1,115	1,319	201 736
Lead concentrate	320,319	316,048	306,395	297,865	65,057 207,334
Lead-copper concentrate	2,719	2,843	2,521	2,204	740 2,028
Zinc concentrate	7,570	7,155	6,262	6,791	1,942 5,596
Total	333,753	328,347	316,293	308,179	67,940 215,694
MANGANESE (Tons)					
Manganese ore — metallurgical grade	34,904	25,623	40,966	27,991	7,837 18,432
Zinc concentrate	5,858	5,680	5,763	5,379	1,079 3,523
Total	40,762	31,303	46,729	33,370	8,916 21,955
MANGANESE DIOXIDE (MnO₂) (Tons)					
Manganese — Battery grade	571	706	1,060	625	236 524
Other grades	668	2,113	1,415	992	35 226
Total	1,239	2,819	2,475	1,617	271 750
MOLYBDENUM DISULPHIDE (MoS₂) (lb.)					
Molybdenite concentrate	†5,236	†8,568	—	—	†576 †576
MONAZITE (Tons)					
Monazite concentrate	132	423	331	345	18 1,290
OSMIRIDIUM (oz.)					
Osmiridium, native	67	42	3	—	— —
Platinum concentrate	2	1	—	—	— —
Total	69	43	3	—	— —
PLATINUM (oz.)					
Platinum concentrate	17	22	—	4	— —

(a) Excludes iron content of iron oxide not intended for metal extraction. (b) Includes lead-silver and lead-zinc ores.

TABLE 5 — CONTENTS OF METALLIC MINERALS PRODUCED: AUSTRALIA — (Continued)

Mineral in which contained	Contents of Metallic Minerals Produced				
	1957	1958	1959	1960*	1961* July-Sept. Jan.-Sept
SILVER (Fine oz.)					
Copper ore	122	1,037	198	64	2,399 5,348
Copper concentrate	360,266	411,304	579,004	694,752	188,075 561,734
Copper precipitate	—	38	—	—	— 31
Gold concentrate	356	492	4	303	567 567
Gold — other forms (a)	193,319	196,778	194,601	206,935	37,528 135,576
Lead ore (b)	393,896	94,757	36,611	53,917	12,322 30,117
Lead concentrate	13,475,649	14,200,130	13,073,288	12,861,275	2,759,248 8,671,386
Lead-copper concentrate	689,373	761,360	671,412	716,940	202,818 595,681
Silver ore	22,498	35,242	29,175	16,919	— —
Zinc concentrate	675,650	638,674	576,338	647,818	180,910 536,715
Total	15,811,129	16,339,812	15,160,631	15,198,923	3,383,867 10,537,155
SULPHUR (Tons)					
Lead concentrate	54,888	51,939	50,468	49,102	11,196 34,836
Lead-copper concentrate	1,031	1,068	841	952	585 1,126
Pyrite concentrate	109,026	108,636	106,881	114,549	31,064 85,612
Zinc concentrate	177,529	160,976	152,355	175,397	44,617 134,976
Total	342,474	322,619	310,545	340,000	87,462 256,550
TANTALITE-COLUMBIT (Ta₂O₅ + Nb₂O₅) (lb.)					
Tantalite-columbite concentrate	23,499	6,736	8,499	11,500	5,032 11,323
TIN (Tons)					
Tin concentrate	1,952	2,237	2,351	2,202	607 1,855
TITANIUM DIOXIDE (TiO₂) (Tons)					
Ilmenite concentrate	38,888	38,278	45,677	59,153	28,138 63,600
Rutile concentrate	124,863	80,955	79,624	86,009	23,362 71,123
Total	163,751	119,233	125,301	145,162	51,500 134,723
TUNGSTIC OXIDE (WO₃) (Tons)					
Scheelite concentrate	950	478	—	291	213 506
Wolfram concentrate	459	372	653	817	221 660
Total	1,409	850	653	1,108	434 1,166
ZINC (Tons)					
Lead ore (c)	—	20	—	—	— —
Zinc ore, for fertilizer	—	—	—	35	— —
Zinc concentrate	291,582	263,024	249,133	290,189	73,185 223,558
Total	291,582	263,044	249,133	290,224	73,185 223,558
ZIRCON (Tons)					
Zircon concentrate	87,703	58,745	112,352	101,264	31,699 100,735

(a) Bullion, alluvial, retorted gold, etc. (b) Includes lead-silver ore. (c) Includes lead-zinc ore.

TABLE 6 — PRINCIPAL CONTENTS OF METALLIC MINERALS AND QUANTITIES OF ASBESTOS AND COAL PRODUCED: STATES AND AUSTRALIA

Content and States	Unit of Quantity	1957	1958	1959	1960*	July-Sept.	1961* Jan.-Sept.
PRINCIPAL CONTENTS OF METALLIC MINERALS PRODUCED							
Antimony	ton	1,209	1,356	1,280	786	137	511
N.S.W.		1,208	1,355	1,279	784	137	511
Victoria		1	1	1	2	—	—
Copper	ton	59,255	75,715	94,950	109,272	25,230	78,619
N.S.W.		4,382	4,023	3,728	3,572	925	2,654
Victoria		—	—	14	—	—	—
Q'land		35,786	50,511	66,798	82,748	17,592	56,829
S. Aust.		2	1	16	5	—	—
W. Aust.		788	1,107	2,197	1,661	180	1,199
Tasmania		10,984	11,413	12,444	11,680	4,153	9,484
N. Territory		7,313	8,660	9,953	9,606	2,380	8,453
Gold	'000 f. oz.	1,084	1,104	1,085	1,086	275	785
N.S.W.		31	19	13	13	3	9
Victoria		46	41	35	29	7	19
Q'land		63	74	92	78	20	50
S. Aust.		—	—	—	—	—	—
W. Aust.		850	875	861	870	219	633
Tasmania		20	22	21	24	8	20
N. Territory		74	73	63	72	18	54
Iron (a)	'000 tons	12,463	12,539	12,700	12,814	1856	12,546
S. Aust.		12,200	12,174	12,219	12,228	1,638	11,915
W. Aust.		263	365	481	586	218	631
Lead	ton	333,753	328,347	316,293	308,179	67,940	215,694
N.S.W.		266,928	246,896	246,449	235,868	52,273	165,787
Victoria		4	—	—	—	—	—
Q'land		51,269	65,799	54,415	57,534	12,240	40,586
S. Aust.		20	13	8	—	—	—
W. Aust.		3,087	1,854	1,382	1,739	172	314
Tasmania		12,445	13,785	14,039	13,038	3,244	8,996
N. Territory		—	—	—	—	11	11
Silver	'000 f. oz.	15,811	16,340	15,161	15,199	3,384	10,537
N.S.W.		9,969	8,992	8,555	8,398	1,888	5,812
Victoria		3	3	2	1	—	—
Q'land		4,305	5,710	4,954	5,123	1,055	3,425
S. Aust.		1	1	—	—	—	—
W. Aust.		188	189	180	197	38	140
Tasmania		1,299	1,395	1,369	1,398	383	1,080
N. Territory		46	50	101	82	20	80
Tin	ton	1,952	2,237	2,351	2,202	607	1,855
N.S.W.		211	239	174	223	45	129
Q'land		772	1,019	1,104	885	298	980
W. Aust.		182	94	174	190	88	174
Tasmania		777	883	890	884	173	569
N. Territory		10	2	9	20	3	3
Titanium (in terms of TiO₂)	ton	124,863	80,955	79,624	86,009	23,362	71,123
N.S.W.		83,363	44,915	44,792	52,262	15,295	46,696
Q'land		41,500	35,755	34,736	33,260	7,970	23,887
W. Aust.		—	285	96	487	97	540
In Ilmenite Concentrate	ton	38,888	38,278	45,677	59,153	28,138	63,600
N.S.W.		485	59	111	537	195	645
Q'land		78	—	—	21	2	2
W. Aust.		38,325	38,219	45,566	58,595	27,943	62,953

(a) Excludes iron content of iron oxide not intended for metal extraction.

TABLE 6 — PRINCIPAL CONTENTS OF METALLIC MINERALS AND QUANTITIES OF ASBESTOS AND COAL PRODUCED: STATES AND AUSTRALIA — (Continued)

Content and States	Unit of Quantity	1957	1958	1959	1960*	1961* July-Sept.	1961* Jan.-Sept.
PRINCIPAL CONTENTS OF METALLIC MINERALS PRODUCED — (Continued)							
Tungsten (in terms of WO ₃)	ton	1,409	850	653	1,108	434	1,166
In Scheelite Concentrate	ton	950	478	..	291	213	506
N.S.W.		1	1	..	..	—	—
Q'land		1	—	—	—	—	—
Tasmania		948	477	—	291	213	506
In Wolfram Concentrate	ton	459	372	653	817	221	660
Q'land		19	5	—	—	1	1
Tasmania		391	360	645	806	208	637
N. Terr.		49	7	8	11	12	22
Zinc	ton	291,582	263,044	249,133	290,224	73,185	223,558
N.S.W.		241,509	211,667	202,675	234,170	56,212	172,820
Q'land		19,536	17,484	13,983	24,394	6,984	23,302
S. Aust.		97	113	—	35	—	—
W. Aust.		—	20	—	—	—	—
Tasmania		30,440	33,760	32,475	31,625	9,989	27,436

QUANTITIES OF ASBESTOS AND COAL PRODUCED

Asbestos							
Chrysotile	short ton	2,232	2,255	1,433	1,141	363	724
N.S.W.		676	712	726	1,072	188	549
W. Aust.		1,556	1,543	707	69	175	175
Crocidolite	short ton	12,438	13,313	16,442	14,472	4,444	10,690
W. Aust.		12,438	13,313	16,442	14,472	4,444	10,690
Black coal	'000 tons	19,919	20,442	20,298	22,575	6,787	17,801
Semi-anthracite	'000 tons	71	57	54	47	17	43
Q'land		69	55	52	45	16	42
Tasmania		2	2	2	2	1	1
Bituminous	'000 tons	18,229	18,616	18,576	20,660	6,204	16,375
N.S.W.		15,376	15,841	15,712	17,737	5,301	14,105
Q'land		112	108	90	77	12	45
Victoria		2,475	2,393	2,477	2,551	825	2,030
Q'land		266	274	297	295	66	195
Tasmania		—	—	—	—	—	—
Sub-bituminous	'000 tons	1,619	1,769	1,668	1,868	566	1,383
N.S.W.		14	10	—	—	—	—
Q'land		157	133	66	61	19	52
S. Aust.		609	755	690	885	295	807
W. Aust.		839	871	912	922	252	524
Brown coal	'000 tons	10,741	11,644	13,035	14,967	4,418	12,289
Victoria		10,741	11,644	13,035	14,967	4,418	12,289

TABLE 7—IMPORTS OF MINERALS AND MINERAL PRODUCTS: AUSTRALIA

Commodity & Country of Origin	Unit of Quantity	1961*					
		1957	1958	1959	1960*	July-Sept.	Jan.-Sept.
METALLIC GROUP							
Aluminium & aluminium base alloys—							
Ore (bauxite)	ton	45,147	69,473	66,746	96,200	10,695	47,791
Indonesia		45,133	69,473	49,466	—	—	—
Other		14	—	17,280	96,200	10,695	47,791
Ingots (refined)	ton	8,374	14,813	19,268	26,432	1,423	13,112
Canada		5,970	13,948	17,985	21,814	464	9,164
Other		2,404	865	1,283	4,618	959	3,948
Rods and bars	ton	661	423	80	80	55	143
Plates, sheets & strips	"	1,881	2,317	2,555	5,770	207	1,318
United Kingdom		1,253	1,335	1,744	4,322	46	816
Other		628	982	811	1,448	161	502
Angles, circles, pipes and tubes	ton	255	87	84	357	36	124
Foil	"	2,193	2,409	2,788	3,909	384	1,738
United Kingdom		2,072	2,078	2,476	3,146	272	1,086
Other		121	331	312	763	112	652
Powder	ton	531	486	670	678	84	336
Wire, single strand, uncovered	ton	43	94	70	138	4	45
Scrap (incl. re-melt)	"	10	102	24	231	23	163
Antimony—							
Ore & concentrate	ton	213	10	37	363	22	22
Metal, incl. antimonial and lead compounds	ton	166	69	174	201	23	123
Arsenic trioxide	lb.	1,586	2,699	2,402	2,779	502	1,155
Bismuth metal	ton	42,589	37,530	36,445	34,378	7,280	28,239
Chromium ore & conc.	ton	8,653	8,772	6,381	21,259	6,402	14,035
Copper—							
Pigs, ingots & blocks (refined)	ton	4,251	659	3,479	4,750	25	2,811
Canada		1,150	50	250	1,099	—	1,349
Rhodesia and Nyasaland		2,001	—	1,002	—	—	—
Other		1,100	609	2,227	3,651	25	1,462
Bars, rods, angles and tees	ton	1,108	1,330	227	508	2	5
Plates, sheets & strips	"	920	939	940	1,911	51	533
Pipes and tubes	"	3	20	22	26	6	56
Wire, single strand, uncovered	ton	12	34	18	15	—	195
Powder	"	83	72	105	161	4	46
Scrap (incl. re-melt)	"	24	17	27	97	5	14
Copper-base alloys—							
Pigs, ingots and blocks	ton	15	7	46	18	6	23
Rolled, drawn and extruded shapes	ton	484	627	671	1,049	163	538
Wire, single strand, uncovered	ton	176	187	126	152	15	82
Scrap	"	144	101	64	113	5	64
Gold—							
Refined forms (excl. specie, leaf and foil)	f. oz.	—	—	—	29	2	2
Unrefined bullion	"	159,998	160,232	136,674	145,365	37,529	114,916
New Guinea		65,929	45,999	44,636	44,791	9,909	28,179
Fiji		67,632	92,925	66,035	71,763	19,015	62,688
Other		26,437	21,308	26,003	28,811	8,605	24,049
Iron ore	ton	203,011	296,157	261,904	278,502	75,651	198,845
New Caledonia		202,982	296,157	261,894	271,474	74,651	198,845
Other		29	—	10	7,028	—	—

TABLE 7—IMPORTS OF MINERALS AND MINERAL PRODUCTS: AUSTRALIA—(Contd.)

Commodity & Country of Origin	Unit of Quantity	1957	1958	1959	1960*	1961* July-Sept.	Jan.-Sept.
METALLIC GROUP—(Continued)							
Iron and Steel—							
Ferro-alloys (excl. powder)—							
Ferro-chromium	ton	1,777	1,892	2,824	5,714	1,037	3,976
Norway		825	961	24	705	—	14
Other		952	931	2,800	5,009	1,037	3,962
Ferro-manganese	ton	5,037	3,060	9,910	30,340	14,301	30,274
Norway		3,434	51	57	5	—	1
Other		1,603	3,009	9,853	30,335	14,301	30,273
Ferro-molybdenum	ton	142	164	108	219	23	268
Sweden		97	138	72	99	13	67
Other		45	26	36	120	10	201
Ferro-silicon	ton	7,154	7,482	10,463	3,905	2,233	8,831
South Africa		1,704	6,217	10,369	2,852	295	1,139
Norway		1,664	1,146	38	69	8	38
Other		3,786	119	56	984	1,930	7,654
Other	ton	469	737	684	1,434	712	1,400
Tinplate	ton	144,199	66,059	50,348	63,741	4,485	29,356
United Kingdom		126,498	57,449	41,818	39,296	3,705	16,885
Other		17,701	8,610	8,510	24,445	780	12,471
Manganese—							
Metallurgical ore	ton	—	5	3	51	73	150
Battery grade ore	"	2,049	1,183	1,304	177	1,030	2,347
Metal and powder	"	67	85	95	70	31	49
Mercury	lb.	55,738	65,398	109,778	149,532	14,291	47,373
Italy		20,798	19,690	42,734	26,995	2,431	12,130
Spain		32,957	23,864	28,122	56,863	9,763	19,577
Other		1,983	21,844	38,922	65,674	2,097	15,666
Nickel—							
Pigs, ingots & blocks	ton	867	674	806	1,518	116	256
Rolled, drawn and ex- truded shapes	ton	45	16	22	14	6	16
Nickel-base alloys—							
Rolled, drawn and ex- truded shapes	ton	n.a.	269	372	363	67	172
Wire, single strand, uncovered	ton	88	78	140	100	30	80
Platinum and Platinum Group Metals—							
Platinum (excl. wire)	oz.	2,153	1,385	994	1,433	501	1,253
Other (excl. wire)	"	1,870	1,108	1,478	1,917	2	821
Wire	"	1,518	1,567	1,769	2,047	220	1,109
Silver, unrefined bullion	'000 f. oz.	77	75	78	69	18	58
New Guinea		34	28	35	32	8	21
Fiji		29	36	28	22	7	19
Other		14	11	15	15	3	18
Tin (refined)	ton	1,218	1,070	1,294	1,708	243	698
Titanium oxide	"	6,172	6,996	5,472	5,054	703	4,389

TABLE 7—IMPORTS OF MINERALS AND MINERAL PRODUCTS: AUSTRALIA—(Contd.)

Commodity & Country of Origin	Unit of Quantity	1957	1958	1959	1960*	1961*	
						July-Sept.	Jan.-Sept
FUEL GROUP							
Coal	ton	9,214	6,315	7,577	5,156	512	6,604
Coke (incl. petroleum coke)	ton	14,887	8,697	7,046	11,639	15	15
Petroleum oils—							
Crude	'000 gals.	2,118,236	2,441,916	2,603,377	2,699,251	721,631	2,143,695
Enriched crude	"	142,908	95,302	35,559	237,336	92,579	276,816
Spirit	"	183,132	207,500	243,910	238,083	51,221	165,810
Kerosene	"	112,789	97,403	109,649	102,965	31,771	94,740
Diesel oil	"	15,922	11,724	9,983	12,473	n.a.	n.a.
Residual, furnace oil	"	13,083	7,617	10,224	12,085	n.a.	n.a.
Lubricating oil	"	40,165	41,665	49,619	49,832	19,081	46,217

NON-METALLIC (Excluding Fuel) GROUP

Asbestos—							
Chrysotile	short ton	22,873	23,408	24,316	28,832	7,230	21,554
Canada	"	18,685	20,323	20,941	24,099	5,817	17,997
Other	"	4,188	3,085	3,375	4,733	1,413	3,557
Crocidolite	short ton	165	311	328	74	38	74
Amosite	"	10,322	13,984	12,019	10,308	2,088	6,224
South Africa	"	10,088	13,417	11,956	10,165	2,087	6,141
Other	"	234	567	63	143	1	83
Other	short ton	528	1,185	1,667	1,958	167	694
Calcium carbide	"	12,776	12,413	13,286	21,340	3,793	12,966
South Africa	"	6,197	7,396	8,953	14,738	3,183	9,864
Norway	"	6,381	4,439	3,335	4,002	—	512
Other	"	198	578	998	2,600	610	2,590
Cement, Portland	ton	11,812	5,744	12,957	14,861	5,373	14,829
United Kingdom	"	4,753	2,564	3,205	3,788	1,466	3,707
Japan	"	4,281	—	2,508	8,709	3,045	8,006
Other	"	2,778	3,180	7,244	2,364	862	3,116
Clays—							
Ball clay	ton	558	407	798	653	257	465
Bentonite	"	5,051	4,952	6,330	7,270	1,121	5,388
Fire clay	"	831	594	698	1,048	81	260
White clay	"	6,631	2,502	14,654	9,093	1,195	12,231
Clays, n.e.i.	"	2,403	2,585	4,764	6,434	1,476	4,440
Cryolite	"	1,475	1,597	858	1,123	1,045	1,074
Diamonds, industrial	carat	215,719	191,335	320,294	372,668	80,207	230,528
South Africa	"	172,695	127,649	184,860	242,639	38,966	93,365
Other	"	43,024	63,686	135,434	130,029	41,241	137,163
Diatomite	ton	3,856	3,736	4,502	4,150	1,211	3,112
Fluorspar (fluorite)	"	545	975	2,080	2,186	606	2,055
Graphite—							
Colloidal	ton	47	52	44	92	33	81
Flake	"	236	280	278	209	64	159
Crystalline	"	81	40	163	9	57	57
Amorphous	"	501	542	488	112	289	289
Kyanite	"	487	500	15	511	17	1,026
Magnesite	"	3,833	6,555	2,680	546	76	11,873
Mica—							
Block or sheet, trimmed	lb.	18,539	21,368	24,184	43,455	1,938	18,319
Cut or stamped	"	2,373	2,594	2,775	2,589	1,040	2,732
Condenser film (not cut or stamped)	lb.	320	—	44	—	1,223	1,223
Splittings (not cut or stamped)	lb.	182,629	149,450	166,975	229,775	69,100	196,186
Ground or pulverised	"	115,653	217,104	270,966	341,042	33,100	237,978
Scrap	"	325,360	558,940	484,996	802,320	79,520	283,360

TABLE 7—IMPORTS OF MINERALS AND MINERAL PRODUCTS: AUSTRALIA—(Cont.)

Commodity & Country of Origin	Unit of Quantity	1957	1958	1959	1960*	1961*	
						July-Sept.	Jan.-Sept
NON-METALLIC (Excluding Fuel) GROUP—(Continued)							
Phosphate rock	'000 tons	1,035	1,501	1,327	1,491	521	1,275
Nauru		590	833	690	789	274	686
Christmas Is. (Indian Ocean)		253	361	434	411	190	407
Gilbert and Ellice Is.		192	298	191	284	57	171
Other		—	9	12	7	—	11
Potassium chloride (fertiliser grade)	ton	40,357	47,942	43,259	41,541	28,798	46,494
Potassium sulphate (fertiliser grade)	ton	4,138	7,389	5,951	5,785	3,448	6,643
Rock	ton	3,336	1,879	2,083	5	—	—
Other	"	4,814	7,178	7,210	19,463	2,030	9,592
Sodium nitrate (fertiliser grade)	ton	9,400	12,804	3,458	5,818	822	4,207
Silimanite	"	132	131	135	259	39	187
Sulphur	"	120,277	202,421	170,770	221,778	46,431	146,253
U.S.A.	"	71,211	146,831	110,519	146,278	22,038	87,108
Mexico	"	48,722	42,840	59,846	71,077	24,270	58,783
Other	"	344	12,750	405	4,423	123	362
Talc	ton	285	307	264	496	426	1,160

TABLE 8—EXPORTS OF MINERALS AND MINERAL PRODUCTS: AUSTRALIA

Commodity & Country of Destination	Unit of Quantity	1957	1958	1959	1960*	1961*	
						July-Sept.	Jan.-Sept.
METALLIC GROUP							
Aluminium & aluminium base alloys—							
Ore (bauxite)	ton	—	—	—	29,778	13	11,826
Ingots (refined)	"	762	—	78	20	—	2
Rolled, drawn & extruded shapes (excl. wire)	ton	83	135	162	282	94	281
Scrap (incl. re-melt)	"	155	123	587	659	209	483
Yttrium ore and concentrate	ton	397	146	—	148	55	136
Admium—							
Ingots and blocks	ton	58	48	17	7	3	15
Bars and rods	"	143	178	126	53	33	87
Copper—							
Ore and concentrate	ton	16,067	14,951	73,286	137,897	32,880	91,125
Japan	"	16,046	14,951	63,717	137,815	32,880	89,417
Other	"	21	—	9,569	82	—	1,708
Matte	ton	493	—	—	—	—	—
Blister copper	ton	19,131	14,421	16,225	502	1,022	1,022
Belgium-Luxembourg	"	3,488	6,805	7,203	502	—	—
Germany, Fed. Rep.	"	1,984	2,060	5,019	—	1,022	1,022
U.S.A.	"	12,620	3,983	4,003	—	—	—
Other	"	1,039	1,573	—	—	—	—
Pigs, ingots & blocks (refined)	ton	1	—	2,749	13,577	6,254	20,702

TABLE 8—EXPORTS OF MINERALS AND MINERAL PRODUCTS: AUSTRALIA—(Cont.)

Commodity & Country of Destination	Unit of Quantity	1957	1958	1959	1960*	1961* July-Sept.	1961* Jan.-Sept.
METALLIC GROUP—(Continued)							
Copper—(Continued)							
Rolled, drawn and ex- truded shapes	ton	1,216	1,365	1,011	2,051	581	1,401
Wire, single strand, uncovered	ton	681	308	314	302	303	318
Scrap (incl. re-melt) Slags and residues	ton	114	279	547	329	303	682
Copper-base alloys—	"		1,332	45	125	95	674
Pigs, ingots & blocks Rolled, drawn and ex- truded shapes	ton	193	18	100	45	4	45
Wire, single strand, uncovered	ton	1,318	283	508	977	596	1,326
Scrap	ton	42	11	12	4	1	5
Copper-lead dross	"	7,833	7,709	4,936	4,866	3,781	9,723
U.S.A.	"	4,078	5,035	6,006	5,116	—	1,372
Other	"	3,755	2,674	—	615	—	—
Gold—							
Ore and concentrate Refined forms (excl. specie, leaf & foil) United Kingdom	ton	14	—	—	—	—	—
Hong Kong	f. oz.	783,814	128,550	128,052	2,513,645	310,279	953,189
Other	f. oz.	771,302	122,520	124,363	2,300,211	31,897	348,711
Unrefined bullion	f. oz.	11,789	5,825	3,704	184,905	143,891	466,982
Ilmenite concentrate	f. oz.	—	—	—	28,529	134,491	137,496
Iron and steel—							
Iron ore	ton	37,811	56,242	68,649	75,319	39,404	88,656
Pig iron	ton	65	6	293	10	26	26
New Zealand	"	15,330	19,321	44,038	97,847	79,225	206,557
Other	"	5,371	9,556	8,504	8,863	1,029	6,137
Ingots, blooms and slabs	"	9,959	9,765	35,534	88,984	78,196	200,420
New Zealand	ton	2,327	728	12,061	9,619	44,338	46,169
Other	ton	4	203	29	205	82	85
Tinplate	"	2,323	525	12,032	9,414	44,256	46,084
Scrap	ton	n.a.	n.a.	1,671	8,080	4,791	12,952
Japan	ton	178,255	156,978	182,985	205,747	55,472	174,661
Other	ton	152,417	134,457	167,645	179,875	53,027	164,833
Lead—	ton	25,838	22,521	15,340	25,872	2,445	9,828
Ore and concentrate Belgium-Luxembourg ..	ton	91,236	83,984	90,797	74,264	25,917	69,140
Japan	ton	5,169	21,822	8,816	8,362	6	6
U.S.A.	ton	31,326	18,029	23,100	26,028	10,085	20,362
Other	ton	50,697	37,552	38,283	23,704	10,768	29,883
Bullion	ton	4,044	6,581	20,649	16,170	5,058	18,889
United Kingdom	ton	47,618	58,068	53,021	49,573	11,339	38,868
Pig	ton	160,589	155,730	138,448	125,265	30,204	93,350
India	ton	57,717	53,407	76,045	66,500	10,046	43,810
New Zealand	ton	3,871	6,126	1,839	2,182	—	145
Japan	ton	4,391	5,350	3,580	4,469	1,058	3,559
U.S.A.	ton	16,106	1,799	1,282	7,409	3,984	9,945
Other	ton	74,707	75,542	46,780	37,634	14,372	33,041
Rolled and extruded shapes	ton	3,797	13,506	8,922	7,071	744	2,850
Antimonial lead	ton	182	99	86	93	12	49
Scrap	"	345	109	597	503	20	282
Slags and residues	"	8,372	5,152	1,390	891	5	100
Other	"	3,011	2,604	991	808	876	1,293

TABLE 8—EXPORTS OF MINERALS AND MINERAL PRODUCTS: AUSTRALIA—(Cont.)

Commodity & Country of Destination	Unit of Quantity	1957	1958	1959	1960*	1961*	
						July-Sept.	Jan.-Sept.
METALLIC GROUP—(Continued)							
Manganese ore	ton	30,061	18,399	31,812	45,639	6,452	27,701
U.S.A.		21,165	7,794	4,165	21	—	—
Other		8,896	10,605	27,647	45,618	6,452	27,701
Monazite concentrate	ton	145	102	150	158	40	1,535
Nickel and nickel-base alloys	ton	28	31	139	104	36	71
Platinum and platinum group metals—							
Ore and concentrate	lb.	24	48	3	7	—	1
Metal and powder	oz.	369	854	197	578	—	—
Rutile concentrate	ton	119,052	75,615	80,938	93,706	276	494
United Kingdom ..		11,022	11,630	8,652	12,717	23,980	73,008
Netherlands		9,871	9,446	10,931	9,903	3,524	10,235
U.S.A.		70,613	26,219	22,537	26,214	3,284	9,746
Other		27,546	28,320	38,818	44,872	5,170	17,943
Silver—							
Refined ingot or bar	'000 f. oz.	3,670	4,875	2,958	2,770	227	766
Refined other	"	2	1	43	30	4	53
Unrefined bullion and matte	'000 f. oz.	12	—	—	—	—	—
Tantalum & columbium ore and concentrate	ton	6	8	8	16	—	5
Tin—							
Concentrate	ton	162	25	42	—	8	188
Refined	"	21	11	9	14	1	1
Tin-base alloys	"	23	50	21	24	—	—
Tungsten—							
Scheelite concentrate	ton	1,387	506	145	505	279	680
United Kingdom ..		59	134	114	235	—	126
U.S.A.		1,167	276	—	—	—	—
Other		161	96	31	270	279	554
Wolfam concentrate	ton	653	442	993	913	205	832
United Kingdom ..		117	66	80	57	20	123
U.S.A.		322	163	722	761	90	295
Other		214	213	191	95	95	414
Zinc—							
Concentrate	ton	323,654	261,279	193,254	322,438	68,229	209,645
United Kingdom ..		179,439	115,875	87,002	153,894	35,720	101,998
Belgium-Luxembourg ..		88,817	115,558	49,372	58,829	4,667	21,730
Other		55,398	29,896	56,880	109,715	27,842	85,917
Refinery-type shapes							
United Kingdom ..	ton	37,092	37,938	41,606	27,443	14,122	32,781
India		3,952	7,727	9,857	2,820	6,155	8,797
U.S.A.		22,337	21,940	17,279	16,375	3,669	14,060
Other		8,002	2,001	6,911	401	501	501
Plates and sheets	ton	2,801	6,270	7,559	7,847	3,797	9,423
Circles and strips	"	135	86	22	43	—	—
Slags and residues	"	1,426	1,004	1,074	1,105	432	974
Scrap	"	4,470	3,476	8,061	6,120	2,282	6,153
Zircon concentrate	"	414	269	344	1,183	166	548
United Kingdom ..		85,254	60,895	108,870	104,630	33,368	106,809
U.S.A.		18,212	21,043	26,635	31,236	6,440	22,374
Other		37,735	19,017	46,135	28,714	9,197	25,114
Other		29,307	20,835	36,050	44,680	17,731	59,321

TABLE 8 — EXPORTS OF MINERALS AND MINERAL PRODUCTS: AUSTRALIA—(Cont.)

Commodity & Country of Destination	Unit of Quantity	1957	1958	1959	1960*	1961*	
						July-Sept.	Jan.-Sept.
FUEL GROUP							
Coal	ton	759,095	823,925	794,190	1,810,755	775,904	1,753,933
Argentina		—	88,891	109,673	—	—	—
New Caledonia		183,280	171,561	143,580	135,199	8,694	67,856
Japan		440,896	360,709	480,613	1,615,932	746,746	1,608,885
Korea, Republic of		93,011	173,243	15,813	49,769	—	9,534
Other		41,908	29,521	44,511	9,855	20,464	67,658
Coke	ton	181,842	52,460	20,899	94,550	30,334	82,038
New Caledonia		145,338	51,848	19,396	92,741	21,759	62,164
Other		36,504	612	1,303	1,809	8,575	19,874
Petroleum oils—							
Spirit	'000 gals.	36,133	80,171	32,823	35,289	17,438	44,549
Kerosene	"	3,087	9,915	16,044	17,188	9,817	37,077
Diesel oil	"	21,294	43,081	89,589	179,490	n.a.	n.a.
Residual, furnace oil	"	156,027	202,052	146,867	174,804	n.a.	n.a.
Lubricating oil	"	1,039	1,050	1,326	1,641	380	1,266

NON-METALLIC (Excluding Fuel) GROUP

Asbestos—							
Chrysotile	short ton	378	264	197	25	—	6
Crocidolite	"	10,892	10,049	12,684	8,177	2,321	5,549
U.S.A.		6,253	6,020	9,655	2,518	610	1,429
Other		4,639	4,029	3,029	5,659	1,711	4,120
Other	short ton	59	120	93	97	10	49
Barite (ground)	ton	3,377	2,494	1,108	7,650	1,175	4,990
Cement, constructional	"	19,342	20,401	13,324	7,607	1,490	3,599
New Guinea		2,205	4,732	2,124	680	48	99
Fiji		5,812	8,659	4,725	59	15	17
Christmas Is. (Indian Ocean)		5,398	1,098	703	1,475	400	700
Other		5,927	5,912	5,772	5,393	1,027	2,783
Clays	ton	799	646	1,110	1,008	174	636
Diamonds, industrial	carat	68,268	41,529	57,478	31,684	20,774	37,824
Graphite	ton	9	8	5	11	1	3
Gypsum	"	41,780	68,138	77,876	85,634	17,241	64,105
New Zealand		40,554	62,128	66,665	71,231	9,264	50,319
Other		1,226	6,010	11,211	14,403	7,977	13,786
Magnesite	ton	53	31	64	106	20	170
Mica	lb.	9,177	28,748	90,248	43,898	13,710	80,427
Opals	value £A	288,951	351,342	674,948	1,036,298	402,891	1,020,971
Salt	ton	18,556	20,346	17,826	18,346	59,767	84,760
New Zealand		17,126	16,982	15,547	15,771	6,117	14,071
Other		1,430	3,364	2,279	2,575	63,650	70,689
Superphosphate	ton	1,616	1,607	1,619	40	—	15
Talc	"	2,326	3,256	2,620	3,905	1,790	3,744

III. APPENDIX

The following later information has become available since compilation of statistical tables for periods up to 30th September, 1961. The figures are preliminary and subject to revision.

TABLE 9 — SMELTER AND REFINERY PRODUCTION OF PRINCIPAL METALS: AUSTRALIA

(Excludes secondary metal (i.e., metal recovered from scrap) unless otherwise specified)

Metal	Unit of Quantity	Production*			
		Oct. 1961	Nov. 1961	Dec. 1961	Oct.-Dec. 1961
Aluminium (refined)	ton	1,240	1,197	1,204	3,641
Cadmium (refined)	"	n.a.	n.a.	n.a.	77
Copper (blister) (a)	"	2,468	2,546	5,097	10,111
Copper (refined)	"	5,019	3,945	3,114	12,078
Gold (refined) —					
Australian origin	f. oz.	95,884	79,394	80,927	256,205
Overseas origin	"	12,480	12,617	15,199	40,296
Total refined gold	"	108,364	92,011	96,126	296,501
Lead —					
Refined (b)	ton	13,859	13,156	13,794	40,809
Lead content of lead-silver bullion produced for export	ton	1,340	2,144	6,071	9,555
Total lead content	"	15,199	15,300	19,865	50,364
Pig iron (c)	"	251,859	233,037	293,403	778,299
Steel ingots (c)	"	337,558	311,393	347,708	996,659
Silver (refined)	'000 f. oz.	661	582	606	1,849
Tin (refined)	ton	205	250	252	707
Zinc (refined slab) (d)	"	12,653	12,029	12,702	37,384

(a) Total production for refining in Australia and overseas. (b) Includes lead content of antimonial lead. (c) Includes recovery from scrap. (d) Includes small quantities of metal recovered from zinc dust used in works.

Note: Particulars of refined aluminium, cadmium, copper, lead, silver, tin and zinc in Table 9 were collected by the Bureau of Mineral Resources.

TABLE 10 — MINE PRODUCTION OF GOLD AND COAL: AUSTRALIA

Item	Unit of Quantity	Production*			
		Oct. 1961	Nov. 1961	Dec. 1961	Oct.-Dec. 1961
Gold (a)	f. oz.	100,493	89,725	93,683	283,901
Coal —					
Black	'000 tons	2,301,190	2,268,933	1,644,988	6,215,111
Brown	"	1,368,513	1,414,258	1,205,781	3,988,552

(a) Gold content of minerals produced