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Brief report on the position
regarding the resources of
iron ore in Australia

by

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BRIEF REPORT ON THE POSITION REGARDING
THE RESOURCES OF IRON ORE IN AUSTRALIA.

Report No. 1945/28.

When the question of iron ore resources in Australia was being considered in 1937 and 1938, it was stated in departmental reports that information concerning the deposits and reserves of iron ore was incomplete, but that sufficient was available to indicate that Australia possessed very small reserves of iron ore in comparison with those of other continents and that the actual reserves were small and sufficient to last for only 50 to 100 years dependent on the future rate of consumption. Consequently it was stated that attention should be paid to conservation of the iron ore and that prohibition of export should be considered until at least a detailed survey had been made of the iron ore resources of Australia.

The Commonwealth Government through its Geological Adviser and acting in co-operation with the States conducted a survey of the iron ore deposits during 1938-1940. A report was completed by Dr. A.G. Woolnough towards the end of 1942 and five typewritten copies made, and by arrangement, one was sent to the Secretary, Department of Supply and Shipping and the others retained in this office. The matter of plates to illustrate the report has not been finalised.

The report was summarised as follows -

"No iron ore deposits capable of development on the major scale demanded by our up-to-date steel industry exists in Queensland, New South Wales, Victoria or Tasmania within economic transportation range of the sea coast or of supplies of suitable coking coal.

In South Australia the detailed survey by the State Geological Survey of the Iron Knob-Middleback Range deposits is still unfurnished. There does not appear to be any probability that the result will increase the estimated tonnage of ore reserves materially.

Pantastic claims of the existence of enormous tonnages of high grade ore between the Middleback Range and Spencer's Gulf have been shown to be without foundation.

In eastern Australia the most important, that at Yampi Sound, has been fairly thoroughly investigated. The estimate by the Mines Department of Western Australia that the deposits of Koolan Island may contain 250 million tons of ore between the outcrop and a depth of 500 feet below sea level may be accepted as a reasonable approximation. Since, however, much of the ore above sea level is exceedingly friable and presents difficulties in mining and metallurgy which are serious if not insuperable, and since the economics of mining versus open-cut extraction are, as yet, indeterminate, it is obvious that this estimate represents a maximum, perhaps economically unattainable. Assuming that open-cut methods have to be adopted, and making reasonable allowance for friable ores, the writer feels that it is unsafe to assume more than about 50 million tons as the maximum amount which can be extracted profitably from the Koolan Island deposits under existing or predictable conditions in the steel industry of Australia, and even this estimate may be optimistic.

It is questionable whether more than 10 million tons, at most, can be obtained from Cockatoo Island.

A deposit, the contents of which are estimated to amount to 75 million tons of ore, has been proved at Koolyanobbing near Southern Cross, at a distance of over 200 miles from the coast, and therefore beyond the present limits of economic transportation.

Large deposits are known to exist at still greater distances from the coast; but these are regarded as still less available as supplies of raw material for our steel industries.

The distribution of suitable fuel supplies is a determining factor in the development of a major steel industry. High grade coking coal is an essential. New South Wales and Queensland alone amongst the States possess abundant supplies of such fuel. South Australia and Western Australia alone possess

major accessible deposits of high grade ore.

Ore must be transported to fuel until a sufficient volume of shipping has been developed to render economical the carriage of fuel to ore as back loading. The stage has been reached in connection with Whyalla, South Australia.

The use of Collie coal as a fuel for iron and steel metallurgy is entirely impossible."

The report made it obvious that the future of the iron and steel industry of Australia depends essentially on the Iron Knob-Middleback Range deposits in South Australia and the Yampi Sound deposits in Western Australia.

The "estimated tonnage of ore reserves" for the Iron Knob-Middleback Range district is not given in figures in the Summary quoted above but refers to the 211,000,000 tons estimated by the South Australian Department of Mines and given in the section of the report dealing with this district. The reserves are "probable" ones and two-thirds of them are represented by the Iron Monarch deposit. Dr. Woolnough's estimate of the amount of ore that could be profitably extracted at Yampi Sound were Koolan Island 50,000,000 tons and Cockatoo Island 10,000,000 tons.

Another factor that affects the position is the composition of the Iron Monarch deposit - the main deposit in the Iron Knob-Middleback Range district. A large portion contains too much manganese, and ore from this portion has to be blended with iron ore of low manganese content. Australian Iron and Steel have stated that in about two or three years supplies of low manganese iron ore must be available for blending with the higher manganese ore of the Iron Monarch. With this object in view the company is arranging to develop the deposits on Cockatoo Island at Yampi Sound. It is therefore obvious that to fully utilise the reserves in the large Iron Monarch deposit, ore is required from other deposits.

Two tables are appended to this report. Table 1 shows the production of iron ore each calendar year from 1926 to 1943 inclusive and the exports of iron ore for the fiscal years from 1930-31 to 1938-39 when export ceased. Table 2 shows the consumption of iron ore in Australia in iron blast furnaces and

steel furnaces for the fiscal years from 1936-1937 to date. The figures have been obtained from the publications of the Bureau of Census and Statistics and, where not published, directly from the Bureau.

Table 1 shows that the production (and therefore approximately the consumption) of iron ore in Australia has been fairly uniform since 1935, and ranged from 1,868,719 tons in 1935 to 2,575,758 tons in 1939, the average annual production for the nine years between 1935 and 1943 inclusive being approximately 2,180,000 tons. Deducting the exports, the average figure of production for local consumption for the same period is approximately 2,000,000 tons per annum. The production has been even more uniform since 1938 and exports of ore ceased in 1939. During this period, the production has averaged 2,280,000 tons per annum.

The consumption figures shown in table 2 are not as uniform as those for production. They show an increasing consumption from 1,425,509 tons in 1937-38 to 2,937,245 tons in 1941-42, with a decrease to 2,517,282 tons in 1942-43. It is evident that stockpiling was conducted in the early years of the period and that the stock-piles were drawn upon in the later years. The consumption in pre-war years was less than 2,000,000 tons, but increased to nearly 3,000,000 tons in 1941-42. It is difficult to estimate the possible post-war rate, but it will probably be at least 2,000,000 tons per annum.

Assuming that the available reserves are 270,000,000 tons and that the post-war consumption will be 2,000,000 tons per annum and remain constant, the ore would be sufficient for 135 years. Assuming further that the consumption increases at 1,000,000 tons per annum over each decade, the consumption in 1955 would be 3,000,000 tons and in 1965 would be 4,000,000.

If the increase in the rate is uniform, the position would be (tonnage figures are millions of tons).

	Ore consumed to	Reserves at	Consumption rate	Life in Years after	Total life years
1955	35	245	3	81.6	91.6
1965	60	210	4	52.5	72.6

If however, the post-war consumption is 2,500,000 tons per annum and remains constant, the life would be 108 years. Allowing the

same increase as above (1,000,000 tons per decade) the corresponding figures would be -

	Ore consumed to	reserves t	Consumption	Life in Years after	Total life
1955	30	240	3.5	77	87
1005	70	200	4.5	44	64

If iron ore is exported, the above periods for which the ore reserves will provide supplies will be reduced by amounts dependent on the quantities of exports. With such an important industry as that of iron and steel, it becomes a matter of national importance to decide whether the possible life (based on present knowledge of ore reserves) should be reduced below the figures given above by permitting export of iron ore.

The present position regarding reserves and consumption differs little from that which existed in 1938 when the exports of iron ore was prohibited by regulation.

The position has become worse to the extent that approximately 15,000,000 tons of ore have been consumed since then; the consumption in post-war years will probably be considerably greater than in 1938; and that the high manganese content of the largest deposit (Iron Monarch) requires low manganese ore from other deposits for blending with it and so necessitates that careful consideration be given to the exploitation of most, if not all, of the important deposits.

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TABLE 1**PRODUCTION AND EXPORT OF IRON ORE**

Production		Exports	
Calendar Year	Amount (tons)	Year ending 30th June	Amount (tons)
1926	591,408		
1927	727,942		
1928	622,975		
1929	843,802		
1930	934,609		
1931	297,400	1931	130,754
1932	549,225	1932	34,241
1933	736,604	1933	13,754
1934	1,263,708	1934	69,595
1935	1,907,462	1935	395,902
1936	1,893,039	1936	432,342
1937	1,871,631	1937	267,129
1938	2,250,599	1938	167,919
1939	2,575,758	1939	132,163
1940	2,317,532		
1941	2,245,502		
1942	2,128,408		
1943	2,132,531		
1944			

TABLE 2**IRON ORE USED**

Year ending June 30.	Blast Furnaces (tons)	Steel Furnaces (tons)	Total (tons)
1937	1,463,968	-	1,463,968
1938	1,425,529	-	1,425,529
1939	1,769,946	-	1,769,946
1940	1,973,044	44,553	2,016,597
1941	2,394,725	67,278	2,462,003
1942	2,865,509	71,736	2,937,245
1943	2,406,909	110,373	2,517,282
1944			