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POSSIBILITIES FOR ASSISTANCE TO THE
GOLD MINING INDUSTRY.

by

G.F. Mead and R.W.L. King.

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SUMMARY

Some historical details of the gold mining industry are supported by a table showing changes in the importance of the industry in the States of Western Australia, New South Wales, Queensland and Victoria since 1903, the year of greatest Australian production.

Possible ways of assisting the industry are reviewed, and the role of the Bureau of Mineral Resources in the provision of basic maps and other data on which private enterprise can base exploration for new gold deposits in Western Australia is discussed.

This means of additional assistance to the industry seems to be the most appropriate, bearing in mind the possible attitude of the International Monetary Fund to more direct forms of subsidy. The possible use of income derived by the States from royalty on other minerals to subsidise gold mining is briefly mentioned.

CONCLUSIONS.

Most forms of direct subsidy suggested to make gold mining more attractive appear likely to run contrary to the principles laid down by the International Monetary Fund.

There is a high level of interest in Australia by overseas companies with adequate capital resources to bring worth while deposits into production.

Short of a rise in the price of gold, deposits sought must be economically viable under present conditions.

The best way to encourage the search for these orebodies by overseas and Australian companies appears to be by provision of suitable maps and other basic scientific information on goldfields areas, thus making them more attractive for the search for gold and other minerals. The Commonwealth and State could co-operate in providing this information.

The industry is at present plagued by labor shortages and anything that can be done to improve amenities in goldfields areas may be expected to help in this respect. Provision of television services seems one way in which the Commonwealth could help.

INTRODUCTION

The rehabilitation of the gold mining industry particularly in Western Australia, has been a matter of concern to both the Commonwealth Government and the government of that state since the end of the 1939-45 war. In 1965 a Parliamentary All-Party Committee of the Western Australian Government enquired into the rehabilitation of the industry, hearing evidence from interested persons in various goldfields centres as well as in Perth.

At that time some thought was given within the Bureau to the difficulties of the gold mining industry in Western Australia and ways and means by which it might be stimulated. This examination of the problem has now been prepared in Record form as it is felt that the importance of the problem and the careful consideration given to it warrant preservation in some permanent form.

HISTORICAL REVIEW

Following the discovery of gold in New South Wales and Victoria in 1851, other important discoveries were made in Queensland (Canoona 1858, Gympie 1868 and Charters Towers and Mt. Morgan in 1882) and Tasmania (Mt. Lyell, 1886). It was in 1886 that the first gold rush in Western Australia (to the Kimberley district) took place.

Subsequent discoveries of note in Western Australia were at Southern Cross in 1888, Nannine in 1890, Coolgardie in 1892 and Kalgoorlie in 1893. Other rushes followed, until by the turn of the century, the Great Fingall at Day Dawn, Sons of Gwalia at Leonora and numerous other mines at Cue, Sandstone, Meekatharra, Nannine, Wiluna, Lawlers, Laverton, Norseman and other centres had been discovered and brought into production. The Western Australian record annual production of over 2 million ounces was reached in 1903, the average grade of ore mined being 21.6 pennyweight per ton. This was also Australia's year of maximum production.

By this date four other States were past their production peaks which were reached by New South Wales in 1852, Victoria in 1856, Tasmania in 1899 and Queensland in 1900. South Australia's peak was reached in 1904 but South Australian gold production was never very high. Northern Territory production is still increasing.

From 1903 the industry in Western Australia declined, due in part to the trend for lower grade ore to occur in depth and to the higher cost of mining from increasing depths.

Wiluna Gold Mines Ltd. decided, after investigation, that with up to date methods the old mines in the Wiluna district could be profitably worked and production commenced in 1932.

Fresh English capital was introduced into the Lake View and Star Ltd. in Kalgoorlie and its mines responded well to the combination of up to date methods and equipment and adequate capital to put them into practice. These two successes pointed out that with efficient methods large tonnages of lower grade ore could be worked at a profit. The spread of unemployment with the depression induced people to return to the goldfields. A general revival began in Kalgoorlie and spread to other areas. The situation was further improved by the higher price of gold resulting from the United Kingdom going off the gold standard in 1931. By 1934 boom conditions prevailed in the gold mining industry.

Western Mining Corporation commenced a systematic search for worth while properties in 1933. Its first success was the Triton mine near Cue followed by the Mararoa mine at Norseman and the Oroya and Iron Duke Mines at Kalgoorlie. American capital brought the Big Bell mine (West of Cue) into production as a large low grade operation; the Lancefield mine near Laverton was re-opened and substantial production was achieved for some years at Yellowdine, near Southern Cross. Numerous other small to medium sized mines were brought into production.

Although some important new mines were discovered, a very large part of the increase in activity was in re-opened old mines. Many of these re-opened mines produced little gold.

By 1939 the Australian price of gold had risen to about £10 per ounce, the wild-cats of the boom years had died, the successful mines had settled down to steady production and there were still good known prospects which had not yet come into production. The shortage of men and materials following the outbreak of war in 1939 halted expansion and after 1941, Commonwealth action in impressment of machinery and restriction of employment in gold mining caused a sharp fall in the production of gold.

After the war there was a reluctance on the part of labour to return to the mines and, although production increased, by 1948 this factor, coupled with the post war rise in price of stores and equipment, had placed many operators under considerable strain. The labour position at Kalgoorlie was relieved temporarily by immigration of some 350 British ex-Servicemen in 1950 especially to work on the mines.

Devaluation of British currency in 1949 meant a rise in the price of gold from £10.15.0 to £15.9.10 per ounce. Unfortunately this rise was swallowed up by rises in wages and costs of stores in less than two years. Apart from a small rise to £15.12.6 per ounce in 1954 no further change in price has taken place.

Since 1954 production has fluctuated but generally declined, and three major operations (Big Bell Mines Ltd. at Big Bell, Great Western at Bullfinch, and Sons of Gwalia at Leonora) have closed.

Some relevant figures showing changes in the importance of the gold mining industry since 1903 are set out in Table 1, which covers the states of New South Wales, Queensland and Victoria, as well as Western Australia. At the present time production in New South Wales is almost entirely a by product of base metal mining. In Queensland a somewhat similar situation exists. Mt. Morgan Ltd., a major copper producer, is the main gold producer. Most of the remaining production is from Golden Plateau N.L. at Cracow, the only significant straight gold mine still operating. It was discovered and brought into production in the early thirties. In Victoria, Wattle Gully Gold Mine N.L. at Chewton is by far the largest producer, and has been operating for many years.

Two declines in gold mining have taken place in Australia in this century. The first followed the boom in gold mining resulting from economic conditions in the late eighteen eighties and early eighteen nineties, and extended over the first three decades of the twentieth century.

The second had its beginnings in the enforced curtailment of operations in the 1942-45 period, though production did in fact increase from 1946 until 1954. Since then there has been a slight decline, held in check by Commonwealth subsidy to maintain existing communities dependent on gold mining.

GENERAL DISCUSSION

An examination of the brief historical outline of events set out above, and of Table 1, shows that the same general pattern holds for Australia as a whole as for Western Australia because of the large proportion of production from Western Australia. In other States, production has shown a steady decrease since 1941.

Declines in production have followed rises in production costs relative to the steady price for gold. Interest in prospecting falls away under these conditions, development of new orebodies is not undertaken and as the established mines close down due to exhaustion of profitable ore, no new mines taken their place. There are a few exceptions to this generalization such as Wiluna, where development of treatment methods for refractory ores led to the re-opening of abandoned mines in 1932 as mentioned above. This decision was taken before devaluation led to the price rise which stimulated production generally in the thirties.

It is reasonable to believe that in part at least the decline in gold-mining, particularly in the post 1945 period, has been due to Australia's increased industrialization. Not only have city dwelling and factory employment claimed gold miners and more particularly gold miners' children, but for those who have stayed in mining, industrialization has led to an increasing demand not only for fuel minerals but also for base metals, iron ore and a wide range of industrial minerals. These latter are particularly suited to exploitation by small companies and syndicates which under an economy based solely on primary production could well have been gold miners.

In these days there is a much wider range of projects for capital investment than in the nineteenth century, or even the first half of the twentieth century.

In the case of the large companies, the rate of change from one interest to another is not so great, but the same argument applies as in the case of the small operator. Gold mining is at a clear disadvantage with a fixed price in competing for the interest of people with capital to invest, under normally expanding economic conditions. This is made all the more pertinent by the fact that the more obvious and rich gold deposits have already been discovered and worked out. Not only must greater effort be expended to find new deposits, but when found and brought into production, greater capital investment and smaller profit margins must also be expected in comparison with earlier years.

The revival of interest in gold mining in 1930-31 and subsequent years was a direct result of economic conditions. Production was stimulated by the rise in price resulting from the United Kingdom going off the gold standard, and the actual number of men in the industry saw a very rapid rise with the provision of schemes for subsidizing unemployed persons with some mining background to go prospecting.

Capital became available for the application of up to date techniques and equipment to larger, lower grade orebodies. Western Mining Corporation Ltd. and Gold Mines of Australia Ltd. revived old mining areas in western and eastern Australia. Bendigo Mines Ltd. made a large scale organized approach to the discovery of new orebodies on the Bendigo field without much success. Dredging was extensively developed in Victoria and to a lesser extent in New South Wales.

There is no doubt that the enforced closure of mines during the period 1942-45 left the industry in a poor state to compete with other avenues for investment of capital in the period of post war expansion. The subsequent rapid rise in wages and prices of materials and equipment quickly nullified the improvement in the condition of the industry brought about by devaluation in 1949, and sales on overseas premium markets permitted since 1951.

The gold mining industry may be considered healthy if sufficient money is available, either by way of profit or capital put up by shareholders, to ensure that prospecting for and bringing into production of new deposits is being carried out at a rate sufficient to maintain an existing level of production. G. Lindesay Clark (Chairman of Western Mining Corporation for many years) considers that this state of affairs exists when the weekly basic wage corresponds with about 70-75% of the price per ounce of gold.

Broadly speaking, the periods when the industry was healthy as defined above includes the 1890 boom to the 1914-18 war, the nineteen thirties to the 1939-45 war and a brief period following devaluation in 1949.

The Gold Mining Industry Assistance Act as extended has done no more than keep existing mines going and there has certainly not been sufficient prospecting and development activity during the present period of assistance to replace closing mines.

The finding of new large deposits suitable for bringing into production under current economic conditions will require a more intensive and sophisticated search than has been carried out in the past.

COMMONWEALTH ASSISTANCE

Following a conference held in Melbourne in 1934 the Commonwealth Government made available to the States amounts of the order of £50,000 each for subsidies and advances to metalliferous mining companies (including gold). A further amount specifically for gold mining was provided by the Gold Mining Encouragement Act, 1940. The funds provided were also used to subsidize prospecting, to provide additional technical and administrative staff, to provide for the operation and loan of plant to prospectors, for the education of miners, for provision of roads and tracks and for various other purposes.

The Gold Mining Industry Assistance Act was introduced in 1954 to maintain operations on which gold mining communities depend. It provides for a sliding scale subsidy per ounce of gold produced, depending on production costs, for large producers. Small producers (less than 500 ozs) receive a flat rate of subsidy per ounce.

The Gold Mines Development Assistance Act of 1962 provided for an allowance in respect of expenditure on development during the financial years ended 30th June, 1963 to 1965. On coming up for review in 1965 it was not renewed, but some of its provisions were incorporated into the Gold Mining Industry Assistance Act as amended in 1965.

DETAILED GEOLOGICAL MAPPING IN WESTERN AUSTRALIA

Western Australia is now the only State in which gold mining continues to be a major employer of labour, and a major contributor to the State's revenue through rail freight, water charges etc. In an attempt to stem the decline the Western Australian Government constituted a Parliamentary All-Party Committee on Gold Mining for the purpose of reporting on the following matters:

"With the object of ensuring the stabilisation and expansion of the gold mining industry in Western Australia, to explore:-

- (a) The recent deterioration of the economic position of the industry resulting from generally rising costs of production and the static price of gold.
- (b) The necessity for a review of the Commonwealth Government's subsidy with the object of a more equitable basis of assistance.
- (c) A possible formula to apply to such assistance to meet future cost increases.
- (d) Means of overcoming the present shortage of labour which is seriously affecting economic tonnage output.
- (e) Means whereby the industry might be expanded.
- (f) Methods for encouragement of organised scientific prospecting for new deposits."

The Committee heard public evidence at various dates between 20th May and 6th July 1965. Most of the evidence was in connection with terms of reference (d), (e) and (f). It is possible that the announcement by the Commonwealth of proposed amendments to the Gold Mining Industry Assistance Act after the Committee was constituted but before evidence was heard may have removed much of the urgency attaching to terms of reference (a) (b) and (c).

Mention was made in the evidence of the possibility of the Bureau of Mineral Resources being requested to participate in work designed to discover new gold mines. The following notes discuss this possibility.

Any proposal to assist in the rehabilitation of gold mining requires first an affirmation on two points, i.e. whether the ore bodies can be found and whether, if found, they will be worth working. It is thought that the prospect of finding large outcropping ore bodies is not large, though not impossibly small, but that major prospects are for the discovery of ore bodies which do not crop out but are totally concealed under sand, soil or barren rock.

Many ore bodies, including most of the Australian gold ore bodies, were formed by geological processes within the earth's crust which were not related to the position of the earth's surface as it was at that time. Furthermore, the process of weathering has removed overlying material and part of some of the ore bodies, but in vastly differing degrees. The proportion of the ore-body which has been removed by weathering, or whether the ore-body has been exposed at all by weathering is largely a matter of chance. There is therefore no reason to believe that ore-bodies which are similar to those already known may not also be concealed under barren rocks. There is also no reason to believe that the valuable metal content of such concealed ore-bodies will not be similar to that of known ore bodies.

Any discussion of the valuable metal content of ore bodies is complicated by the fact that the boundaries of leases, on which production returns are made, are artificial. It is better to consider a group of ore-bodies in close proximity as one for this purpose.

The attached Table II shows the average amount of gold actually recovered per ton of ore mined in the more important gold mining centres of Western Australia since the start of production. The list is in order of quantity of gold produced. Many of the figures including the centres with the highest production are sufficiently high to be not merely profitable at present-day costs but also are well in excess of the recovery below which they would be eligible for subsidy.

The conclusion is that if concealed gold-ore bodies exist, there is a reasonable chance that they can be discovered and that if discovered there is a reasonable chance that they will be profitable.

The application of scientific method to any problem involves the following steps :

- (a) Collection of data.
- (b) Formation of an hypothesis which unifies or explains the data and affords a basis for predicting other data.
- (c) Testing, by means of experiments or further collection of data, of the predictions made by the hypothesis.

These steps apply to the problem of discovery of ore-bodies. The collection of data is required as a means of interpreting the processes which caused the deposition of ore-bodies and of identifying new areas in which these same processes may have operated; the hypothesis is the actual identification of these processes and the testing of the hypothesis is the actual testing of a locality by drilling or underground work.

The collection of data takes a number of forms, i.e. the mapping of outcrops (where exposed) the systematic collection of soil samples in a soil covered area, the mapping of various geophysical phenomena, (magnetic force, electrical conductivity etc.) and the laboratory examination of rocks and minerals. This work is all for the purpose of obtaining a broad view of the geology of known ore deposits and, by working from the known to the unknown, to predict other favourable areas, which possibly may be blanketed by soil or sand. It may be desirable to treat the whole of the Western Australian gold-fields as a unit for this purpose.

The standard unit for regional geological work is the sheet map at a scale of 1:250,000 (3.95 miles to the inch) covering an area $1\frac{1}{2}$ degrees of longitude by 1 degree of latitude or approximately 6,300 square miles per sheet. Known Western Australian gold deposits occur on thirty-five of these map areas and it is possible that concealed ore-bodies occur on other map areas. The area of outcropping rocks is variable, ranging roughly between 40 and 70 per cent on the areas where known ore bodies occur.

Western Australia has had a Mines Department Geological Survey since 1896. A large amount of geological work has been done by the Geological Survey on the gold-fields but much of this work is too old to be of any great value. New methods of survey, the most important of which is the use of aerial photographs, and new ideas on interpretation, have made much of this work obsolete. By modern standards no more than six map-sheets have been adequately mapped geologically and even in these areas no attempt was made to map sub-surface geology in soil covered areas. If the Western Australian gold fields are to be properly mapped geologically as an aid in finding new ore-bodies most of the work is still to be done.

Such work would take plenty of manpower, if it is to be done in a reasonable time. It is considered that four geologists with the usual assistance can do the field work for one 1:250,000 sheet in a field season of four months but this time may have to be extended if any large amount of auger drilling for soil sampling or rock testing has to be done. The actual preparation of the map would have to await the completion of laboratory work on the samples taken and on interpretation of any geophysical work which was done on the same map area. One or two map sheets annually would probably be a reasonable rate of progress in ordinary circumstances but the Western Australian Government and the gold mining industry would consider the matter to be unusually urgent in view of the deterioration in the position of gold mining.

The Bureau has already done a considerable amount of geophysical work in the Western Australian gold-fields in the form of aeromagnetic surveys. Eleven 1:250,000 map sheets have been completed as well as some work in closer detail around Kalgoorlie. All of this work has been useful in extending knowledge of the regional geology by revealing geological boundaries, regional patterns of major folding and subsidiary cross folding and the presence of faults and igneous intrusives. The interpretation of this type of work is easiest when it is done in conjunction with an up to date geological map. The aeromagnetic work is already further advanced than the geological mapping and although the Bureau could do more aeromagnetic work in the Western Australian gold fields, it is less urgent than geological mapping unless it is decided to map geologically some area for which the aeromagnetic mapping has not been done.

To make a geological map of one 1:250,000 area which will be adequate for the purpose of finding new ore-bodies will therefore require the work of several geologists and field assistants for one season, aeromagnetic mapping if it has not already been done, one or more auger drilling teams for soil and bed rock sampling, and possibly some ground geophysical work. The Bureau could perhaps undertake one map sheet per season by re-arranging its proposed programmes but if a major effort were needed it would require more staff or a major reorganisation in the Bureau's activities, or outside assistance.

It is possible that examination of the results of mapping at a scale of 1:250,000 would show the need for further mapping at a larger scale in certain places. The next largest standard map area used is the 1:50,000 covering an area ³⁰~~25~~ minutes of longitude by 15 minutes of latitude. ~~Twenty-four~~ of such sheets cover the same area as one 1:250,000 sheet map but these larger scale maps cannot be obtained merely by enlarging the 1:250,000 scale map. The area must actually be remapped geologically for detail which would not appear on the 1:250,000 scale map and therefore was not mapped.

Any Bureau participation could cease at this point or continued participation could take the form of providing the synthesis of the geology of the Western Australian gold-fields, or of selected parts of them which may be considered to form a separate metallogenetic sub-province, which is necessary for the next stage of the investigation, i.e. the prognosis of favourable areas or favourable locations. This work would be sholly office work and would be based on a reasoned summary of all available information and the conclusions drawn therefrom.

It is considered unlikely that the Bureau would wish to continue beyond the publishing of the results and maps or revealing of the prognoses to exploration companies. Only in the circumstances that the Bureau was firmly convinced that a prognosis was sound and yet no exploration company would undertake testing would any further work be proposed for consideration. This would take the form of a limited programme of drilling, probably done by contract, as a means of demonstrating the soundness of the prognosis.

PARLIAMENTARY COMMITTEE ON THE GOLD MINING INDUSTRY - WESTERN AUSTRALIA

An examination of newspaper reports of evidence given before the Parliamentary Committee shows that five main types of assistance to the industry were suggested :

- (a) by direct subsidy for various phases of prospecting and small scale operation;
- (b) by increased activity by Government in providing the scientific background for more detailed prospecting.
- (c) by indirect subsidy by way of reduction in charges for state-supplied services, taxation etc., to make employment in the gold mining industry more attractive, and to reduce mine operators' costs;
- (d) by revision of mining legislation to make the way of the gold prospector, both individual and company, easier;
- (e) by provision of amenities (such as television) in goldfields areas with a view of reducing some of the major difficulties in ensuring adequate supplies of labour.

Increased government assistance by way of geological mapping on a larger scale has already been discussed at some length above.

Amendment of mining legislation, except in the Territories, is a matter for the State Governments, as is any question of subsidy by way of concessions of State-provided services.

Ultimately the question of subsidies generally reverts to the Commonwealth, as the principal collector of public income. However, the States, except Tasmania, receive royalties on other mineral products (iron ore, bauxite, silver, lead, zinc) and have a source of income which could legitimately be used for encouragement of mining other minerals - in this case gold, but prior to the export of iron ore Western Australia was only fourth in the order of State revenue from mineral royalties. Western Australian mineral royalties amounted to about \$250,000 in 1964.

Some of the suggestions made at the Committee are out-lined in Appendix 1 of this Record.

Gold mining companies themselves have, because of the present state of the industry and the low capitalization of most of them few resources to devote to a major exploration effort, particularly in the absence of any substantial general incentive such as a major rise in the price of gold or a subsidy for exploration. It appears therefore that best results will be obtained by encouraging the many overseas companies interested in mineral exploration in Australia to give high priority to the search for gold deposits.

Short of a rise in the price of gold, or a subsidy for exploration which would amount to the same thing, the best way of doing this would be by way of the extensive programme of mapping and surveying of goldfields areas outlined above. Areas for which much basic data was available would be more attractive for the overseas companies than those for which the basic mapping remained to be done. Existing gold mining companies generally do little prospecting. The exception is the Western Mining Corporation and its associated companies. If there were large areas available where the basic geological work has been done on a reasonable scale by Government more companies might be prepared to allocate some funds to prospecting.

The formation of the Australian Mineral Industries Council to represent the industry in Canberra should result in a greater awareness in Government circles generally of the part that gold mining has played in the past growth of the nation and of the difficulties facing this industry today.

While most of the subsidies suggested fall within the State Government's jurisdiction the precedent of 1934 exists for a special provision of Commonwealth funds for the purpose of a State-administered subsidy of the industry.

Apart from the project on geological mapping and surveying, calls for direct Commonwealth action would appear to be limited to the provision of television services, further review of the Gold Mining Industry Assistance Act and remission of income tax shareholders employed on gold-mines, or at least to a review of the zone allowance applicable to the goldfields. It seems probable then that a policy of increased scientific effort to provide a sound background of fact for the search for gold deposits is the best to follow at the present time. Many of the suggested subsidies might well be incompatible with the principles laid down by

the International Monetary Fund. It could perhaps be suggested to the Western Australian Government that income from iron ore royalties might be used to encourage gold mining in ways not open to the Commonwealth because of the International Monetary Fund.

EFFECT OF DISCOVERY OF NICKEL SULPHIDE DEPOSITS AT KAMBALDA.

The discovery of nickel sulphide deposits at Kambalda near Kalgoorlie by Western Mining Corporation in 1966 has led to increased interest in those areas of the Western Australian goldfields where other nickel deposits may occur by major exploration companies, and by some of the gold mining companies themselves. The presence of other potentially valuable mineral deposits beside gold would increase the value of mapping the goldfields areas at quarter million scale. Available finance could be more profitably spent on more detailed work in areas where an adequate background of 1:250,000 scale mapping was available.

While the broader base to the local economy that nickel mining operations will bring, will undoubtedly be of considerable benefit to the stability of these areas, one can foresee some difficulties regarding wage scales etc., if any attempt is made to differentiate between nickel and gold mines either by employers or employees.

REFERENCES AND ACKNOWLEDGEMENTS

Although no particular references are cited, information was collected from such sources as Annual Reports of State Mines Departments, particularly Western Australia; from the Industrial Review and Mining Yearbook, and the Commonwealth Yearbook; from various books by author Geoffrey Blainey; from Presidential addresses and other publications of the Australasian Institute of Mining and Metallurgy; the Victorian Mines Department's Mining and Geological Journal and other publications and from newspaper and other accounts of evidence presented to the Western Australian Government All-Party Committee. The comments of other Bureau officers on specific aspects of the proposals for detailed mapping and surveying are also appreciated.

TABLE I
SUMMARY OF GOLD MINING INDUSTRY
(Major producing States)

State and Year		Production- fine ounces	Av. Grade Lode Mines	Proportion of Value of State Min. Prod.	Men Employed	
					All Gold	Lode Only
Western Australia	1903	2,064,801	21.6	97.0	20,716	17,329
	1929	377,176	12.0	76.7	4,108	4,002
	1937	1,000,647	6.6	94.8	16,174	15,845
	1941	1,109,318	5.3	95.5	13,106	12,930
	1945	468,551	5.4	84.9	4,818	4,786
	1954	850,540	5.3	66.7	6,128	6,099
	1963	800,212	5.8	59.4	4,901	N.A.
New South Wales	1903	295,778	10.6	17.0	11,247	5,341
	1929	7,496	13.0*	0.2	684	407
	1937	68,607	6.8*	4.3	3,885	1,694
	1941	88,091	6.7) (a)	5.7	2,330	1,204
	1945	43,129	5.2)	2.6	509	254
	1954	31,374	N.A.	0.4	161	N.A.
	1963	11,395	N.A.	Negligible	59	N.A.
Queensland	1903	668,546	21.8	77.0	9,229	7,278
	1929	9,476	17.2	2.4	326	191
	1937	127,281	10.2 (b)	24.8	3,436	2,731
	1941	109,064	7.2 (b)	21.7	2,983	2,562
	1945	63,223	9.2 (b)	15.4	1,253	1,176
	1954	98,754	7.0 (b)	5.7	1,464	1,207
	1963	67,762	7.5 (b)	1.9	N.A.	N.A.
Victoria	1903	822,424	9.0	96.4	25,208	14,150
	1929	28,782	10.6 *	5.5	864	527
	1937	145,799	8.6 *	46.8	7,250	3,099
	1941	149,769	10.0 *	46.4	2,801	1,809
	1945	61,790	11.6 *	28.7	643	486
	1954	52,665	9.4 *	14.4	554	369
	1963	24,769	7.8 *	3.7	181	N.A.

NOTE: * indicates one or more major producers of lode gold used to estimate the average grade.

(a) New Occidental only major producer

(b) Excludes Mt. Morgan

N.A. Not Available

TABLE II

Recovered grade of main Western Australia centres
(Pennyweights per long ton)

Boulder	8.5
Coolgardie	9.0
Leonora	7.6
Norseman	8.3
Wiluna	4.0
Mount Magnet	9.2
Meekatharra	10.6
Day Dawn	11.0
Menzies	15.3
Laverton	7.3
Kalgoorlie	7.6
Lawlers	7.1
Bullfinch	3.5
Sandstone	12.9
Westonia	12.7
Kanowna	11.5
Kookynie	10.0
Mount Morgans	9.5
Marvel Loch	4.5
Youanmi	7.5
Southern Cross	7.2
Peak Hill	8.8
Mount Ida	10.5
Mount Palmer	10.3
Reedy	6.6
Comet Vale	14.5
Davyhurst	13.0
Broad Arrow	15.5
Bonievale	10.9
Ora Banda	7.1
Grant's Patch	8.1
Marble Bar	18.2
Yarri	5.4

APPENDIX I

Some Ways to Assist Gold Mining in Western Australia

Suggestions to Parliamentary All Party Committee.

1. Amend mining legislation to increase the size of Temporary Reservation from 300 acres to 5000 acres.
2. Also allow Temporary Reservations for gold and base metals, instead of one or the other as at present.
3. Station a geologist at Port Hedland to advise Pilbara prospectors on mineral search including gold.
4. Amend legislation to protect the week-end prospector from claim jumpers.
5. Increase maximum subsidy on ore carted to State Batteries for treatment.
6. Provide secondary education facilities in the Murchison (Mt. Magnet) area.
7. Amend Gold Subsidy Act to provide subsidy on gold produced from tailings dumps, and to increase the subsidy paid on the first 100 ozs. of small producers to £5 per oz. Provide an office in Kalgoorlie to deal with claims for subsidy.
8. Revise system of payment for gold in sands by State Batteries to provide for earlier payments than is the case at present.
9. Increase payments to prospectors on subsistence to the equivalent of the basic wage.
10. Provide subsidy on a £1 for £1 basis for the use by prospectors of an auger drilling unit, and for operating costs of prospecting parties generally.
11. Allow a free market for gold within Australia.
12. Remove obligation for assisted prospectors to repay allowances received out of proceeds of discoveries made, thus placing them on the same basis as unemployed on relief from Social Services.
13. Provide flotation plant to treat prospectors' sulphide ores in the Pilbara.
14. Subsidise purchase of equipment by prospectors and small operators.
15. Subsidise cartage of food by mail truck to prospectors.
16. Provide rail freight concessions on smaller lots than the present 8 tons minimum now available.

17. Provide dual gauge railway track to Kalgoorlie mines.
18. Provide general freight reductions on stores and equipment delivered to all mines.
19. Reduce charges for water supplied for mining operations.
20. Help meet the mounting costs of Workers Compensation Act in respect to industrial diseases.
21. Provide interest free loans for exploratory development of new mines.
22. Establish a "Gold Bureau" in Canberra to promote and foster the interests of the Gold Mining Industry.
23. Grant gold mining employees total or partial exemption from income tax, especially if they are shareholders in the mine in which they work.
24. Assistance by State Government toward decentralization of industry into the goldfields area.
25. Provide television services to goldfields.
26. Convince Governors of the International Monetary Fund of the need to raise the gold price to at least \$70 per ounce.
27. Counter adverse propaganda by factual statements on the economic worth of the gold mining industry and the desirability of its continuing.
28. Actively engage in recruitment of migrants to build up goldfields work force.
29. Provide housing on a rental or purchase basis for married migrants and hostel accommodation for single ones.
30. Place goldfields in the higher zone of income tax allowance.
31. Assist in establishment of industries for employment of relatives of mine employees.
32. Improve facilities at goldfields educational establishments.
33. Provide more technical assistance to the search for new orebodies.
34. Allow mineworkers two concessional rail fares per year now that annual leave may be taken in two parts.
35. Improve amenities for workers on mines (change-houses etc.)

36. Reduce the cost of initial exploration (funds for this purpose carry highest risk) and of bringing new mines into production (thus improving likely return on capital invested).
37. Subsidize use of pipelining machinery for costeaning in areas of concealed outcrop.
38. Encourage private drilling operations on abandoned mines.
39. Raise funds to spend on encouraging the gold industry by a special addition to income tax.
40. Pay a "no strings attached" subsidy of £10 per ounce to all producers.
41. Carry out an extensive government programme of diamond drilling in suitable areas.
42. Others thought that (41) should be carried out by private enterprise, government agencies restricting themselves to providing the background of scientific facts.