Victor. T. Edquist, 'A review of the gold mining industry of Western Australia', an excerpt from the AusIMM Presidential Address in the *Proceedings of the AusIMM,* No. 128*,* delivered in Melbourne on 27 October 1942 and printed in the *AusIMM Bulletin,* June 2017.

The review by the then President of AusIMM, Victor T. Edquist, presents a snapshot of the problems, trials and tribulations facing the gold mining industry during World War II and beyond, and should be of interest to all mining historians.

I had hoped when the time came for me to address this meeting that gold mining would be in a much happier position than we find it today. As it is, and because of the demands of national security, we find this great and valuable primary industry relegated to the background and in danger of temporary extinction.

These notes refer mainly to gold mining in Western Australia, whence comes the major portion of Australia's production, and their purpose is to record a brief review of the industry immediately prior to the general disorganization that is following the call up of men from the mines. During this period of reduced production the loss of comparable statistical data will make it impossible to follow the progress of the industry, and, since the period may be long, it occurred to me that information might be derived from an examination of the trend of recent production that would indicate what may be expected of the industry when full production is resumed in the future.

Since the survival of gold mining which started in 1931, most of the old-established mines have reorganized and enlarged their equipment in order to achieve maximum production, and old mines hitherto unpayable have been re-opened and equipped. At the same time large sums have been spent in scientific prospecting and in search of new mines, and it is safe to say that at the end of 1939, when gold production reached its peak, practically every known mine in Western Australia that could be worked profitably was in production. During this period the number of men employed in the industry rose from 5061 in 1931 to approximately 15000 in 1939.

From the outbreak of war in 1939 to the end of 1941 the output from the mines was maintained at full pressure, maximum tonnage being recorded in 1940, although a reduction in the grade of ore treated caused a slight falling off in gold production.

During 1941 there was a fall in both tonnage and grade. The decline in tonnage was due partly to the closing of the Lancefield and Mount Magnet mines, and partly to the shortage of labour brought about by the response of the goldfields to the call for men for the fighting services, the average number of men in the industry in this year being reduced to 12929.

With the entry of the United States into the war in December last and the pooling of the resources of the allied nations, the need for gold as a purchasing medium passed, and with its passing there arose the demand for the transfer of the manpower engaged in gold mining to other fields of industry directly connected with the war effort.

There was a ready response by those connected with the industry who recognized fully the importance of these demands. It was, however realised that any precipitate action in the wholesale withdrawal of men and closing down of mines would cause irreparable injury to the industry.

It was recognised by all that if the industry was to be preserved as an avenue for post-war employment, the mines must be maintained in working condition and the oganisation directing them retained.

Further, the closing down of mines outback would cause the virtual abandonment of these outlying centres of population which would be most undesirable from a national point of view, quite apart from the distress that would follow such a course.

The matter was examined from all angles to determine the best means of releasing the maximum of manpower without causing lasting damage to the mines.

While a number of relatively small properties could be closed down without damage, the majority of the older deep mines call for continuous heavy expenditure in maintenance or pumping in order to keep the workings open. The closure of these mines without proper maintenance would lead to the possible collapse of the workings and such damage as would preclude their profitable re-opening.

Undoubtedly the best course to pursue would be to keep the mines working, retaining in the industry the least possible number of men required for their minimum effective operation. This course would take care of, and retain in employment a large number of aged employees still capable of useful work in the mines but otherwise too old for military service or for effective use in the labour corps.

Proposals to this effect have been approved by the federal authorities, and at the present time men ar being steadily withdrawn. This process will continue until the agreed minimum has been reached. At the same time, provision has been made to meet the cost of maintenance of those mines that that may conveniently be closed down, or for those that are unable to continue operations under these conditions. It is estimated tht a a minimum of 4500 men would be required to maintain the industry.

These are the main points in a well-considered attempt to preserve the industry, and success is dependent on the strict observance by all parties of the provisions as agreed.

Of particular interest are the production figures for the last three years. In 1939 the tonnage was 4095257 for a yield of 11888286 ounces, the grade of ore treated being 5.8 dwts. In 1940 the tonnage rose to 4291709 ounces with a grade of 5.38 dwts, the yield falling to 1154843 ounces, while in 1941 the tonnage fell to 4201710, the yield to 1105477 ounces, and the grade to 5.25 dwts.

Having regard to the closing down of the Lancefield and Mount Magnet Mines, and the shortage of manpower that made itself felt in the second half of 1941, the fall in tonnage was to be expected. The lower grade, however, is a matter for comment.

It may fairly be stated that with the steady increase in the price received for gold, the principal mines would bring into their ore reserves marginal ore, and regulate the grade of ore mined to obtain the best economic results commensurate with the price of gold and operating costs.

The increase in the price of gold has not offset the reduction in grade. During this five-year period the price of gold advanced 12.5 per cent, while the grade of ore in dwts per ton declined 21 per cent, the net fall in corresponding money value per ton being 11 per cent.

Having regard to the steep rise in operating costs in the past year, during which time the price of gold was practically constant, the continued fall in grade may reasonably be ascribed to causes other than a voluntary reduction, and therefore the decline, particularly during 1941, becomes a matter for grave thought and consideration.

Another question of equal importance is that of costs, the governing of which is largely beyond the control of the mine management. Since early in 1938 the basic wage for Kalgoorlie has moved from £4/7/- to £5/5/7 per week, an increase of over 20 per cent, while during the same period the industry allowance, which is determined by the price of gold, has risen from 12/- to 18/- per week, making a total wage rise of 24/7 per week. At the same time there has been a steady increase in the cost of stores, particularly oil fuel, which has almost doubled in price.

The renewal and reconditioning of mine equipment, coupled with an increased throughput, would have under ordinary circumstances resulted in a reduction of operating costs, but these advantages have been more than offset by the increases mentioned. The net increases in costs during this period for the larger producing mines range from 1.5/- to 3.5/- per ton. Up to the end of 1939 the effect of increases in labour and stores was not apparent, being largely absorbed in higher tonnage and economies that were possible with new plant and equipment. In 1940 the effect was more noticeable and difficult to control, while in 1941 the rise was such as to become a source of serious importance and concern, particularly to low-grade producers.

Connected with the question of grade and the problem of of costs are mining and metallurgical efficiencies. During recent years the introduction of mechanical aids underground has played its part, while metallurgical research has revolutionized the treatment of refractory Kalgoorlie ores, and I think it reasonable to say that metallurgical work in Western Australia today compares favourably with anything elsewhere. There appears but little room for further immediate substantial economies in mining or higher metallurgical recoveries to counteract the effect of declining grade and rising costs.

An examination of the production table for the past two years shows that in 1940 no less than 25.6 per cent of the total tonnage from mines whose grade was under three dwts per ton, the average being 2.65 dwts, while in 1941 the corresponding tonnage was 24.6 per cent of the whole, and the grade of this tonnage 2.38 dwts per ton. These figures are interesting, since they show not only a reduction in tonnage but also a relatively large decline in yield which, when coupled with the rapid increase in costs, indicate that these low-grade producers are approaching a very serious position.

The mainstay of the industry is revealed in those mines whose grade of ore lies between three and seven dwts per ton. In 1940 this group of mines produced 64.4 per cent of the tonnage and 68.4 per cent of the total gold yield from ore having and average grade of 5.7 dwts, while the corresponding figures for the year 1941 were 62.7 per cent of the tonnage and 63.2 per cent of the yield, the grade being 5.3 dwts. Here again in the mainstay producers a contraction in both tonnage and grade is recorded.

At the present time, owing to the disruption of the industry by the release of manpower and reduction in output, it is not possible to assess the increase in costs attributable to labour and supplies, but with a further rise in the basic wage since the end of 1941 and the incidence of rising indirect taxation – the major portion of which is borne ultimately by the primary producer – the evidence is that the steady increase continues. Therefore it appears reasonable to assume that post-war production will start under the dual handicap of lower grade and higher costs.

The reduction in manpower will force out of production a number of mines that need to operate at full capacity in order to make ends meet. The effect of any serious increase in cost during the shut-down period, without a corresponding rise in the price of gold, would probably preclude their profitable re-opening.

With these factors in view, and allowing for the possible exhaustion of at least one large low-grade producer during the war period, one cannot escape the conclusion that a most serious contraction in both tonnage and yield is to be expected when full operations are resumed after the war. The problem is one that will call for most sympathetic consideration.

Fortunately the position of the large medium-grade producers, which I have referred to as the mainstay of the industry, appears to be sound, and unless conditions become very much worse than they are today their resumption on a pre-war scale may reasonably be anticipated. At the same time, if the industry is to be restored to anything like the position existing at the end of 1941, it is clear that new mines must be found. Mining engineers with an intimate knowledge of Western Australia have no doubts as to the existence of further payable gold deposits in the vast areas of favourable greenstone that are masked by laterite. Systematic search and prospecting are necessary for their location, and a steady flow of money for this purpose will be required. In prospecting, the prizes are few and the disappointments many, but with encouragement I have no doubt the search will go on as in the past, but encouragement there must be in no uncertain way if the leeway of the war period is to be overtaken.

Payable mines are national assets, and it behoves the government to stimulate the search by subsidy or at least to free from taxation money that is subscribed for prospecting or for development of prospects. The following will illustrate the value of Western Australian gold mining as a national asset:

- during 1940 the value of the gold produced: £12299000
- collection by Federal Government of gold tax: £952700
- direct collection by the state of Western Australia from gold mines #2300000
- total direct collections by state and federal governments £3252700
- paid in dividends to shareholders £1059000

These direct collections by the state and federal governments are apart from the indirect benefits derived from the employment earnings of over 14000 workers.

In the past the federal government has shown depreciation of this value by refraining from taxing gold mining profits, and in their most recent tax proposals have announced their adherence to this principle. Their foresight in this connection is to be commended. They have, however, failed to restore the the complete exemption from taxation of call paid to mining companies for development purposes, and this menace to the rehabilitation of the industry remains.

As to the future of gold, who can foretell what changes in the social and economic structure will develop after the war? It is to be expected that that the pooling of national resources, which is now being done for specific war purposes, will cease with the war, and we shall be forced back on our own resources for the enormous task of post-war reconstruction, when every available ounce of gold will be needed.

It appears as a reasonable assumption that future world peace will be based on the re-establishment of international trade. If this be so, then there should be no question as to the need or value of gold, and we can anticipate the resumption of the industry, although probably on a diminishing scale.

These are the conclusions from a review of the industry as I see it today, but it should be remembered we are living in a world of changing values. The general increase in the cost of labour and commodities are a measure of, and reflect the reduction in the purchasing power of our money. There is nothing to indicate that gold as the world's real measure of value has changed, then surely it is logical to assume that when freedom is restored the price of gold in our money will have advanced proportionately.

This adjustment may take some time to come into effect. Meantime, the gold mines may be expected to resume under economic and social conditions far more exacting than those of the past.

Of one thing I feel certain, and that is, there should be no-one better fitted for the task of facing these problems than the young mining engineers who will return from war service to civil life with broadened outlook and the will to rebuild and restore peaceful enterprise.

Victor T. Edquist