REPORT BOOK 19/251

D.M. 214/43

17th January, 4

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Dear Sir,

POST WAR ACTIVITIES IN THE MINING INDUSTRY.

With reference to your letter of 1st November and a subsequent discussion on the occasion of your visit to this office I have to make the following remarks:

Of the major avenues for expansion in the mining and metallurgical industries of the State several have been brought under the notice of the appropriate interests by the Hon. the Premier, who has had these problems under consideration for a long time. The main suggestions thus put forward have been concerned with the establishment of a steel-making plant at Whyalla; the recovery of zinc from the accumulated and current slags at Port Pirie; and the recovery of elemental sulphur from the gases now discharged into the atmosphere at Port Pirie. Each of these suggestions is concerned, as you will see at once, with the operations carried out by competent well-qualified engineers in the employment of organisations with the funds to put them into effect as soon as they are authorised. In addition the question of manufacturing plaster of Paris and plaster board within the State has been taken up with Waratah Gypsum Ltd.

So far as concerns other possible developments I have to make the following remarks:

1. Copper Mining.

Many of the copper mines of the State must be regarded as having passed beyond the power of revival into a profitable condition, especially those in which the supply of workable ore failed abruptly with the exhaustion of the oxidised ore and secondary sulphides.

A good deal of prospecting, by drilling, has been done on the Moonta and Wallaroo field in the endeavour to locate other shoots of ore along many of the known lines of fracture in which the worked orebodies occur. This field has in the past produced such a large proportion of the total copper output of the State that this effort is judged to be soundly based. Although much has been done in this way there still remain several areas to be tested by drilling. In Mining Review No. 77, pp. 50-51, there is a schedule showing the amount of drilling yet regarded as necessary at sites selected on geological reasoning or on indications given by geophysical surveying. Since this schedule was prepared by Mr. Dickinson further consideration shows that the programme for the Moonta area may be extended with good justification into an area that has not been explored. The question of accelerating the accumulation of information by drilling is discussed in a later portion of this letter.

The other large past producers of copper are the fields of Kapunda and Burra, but the prospects of profitable mining in depth below the old main workings are not judged to be encouraging. It is desired that a geophysical survey be made of the northern portion of the Burra field where the geological structure is masked by superficial cover, before further consideration is given to this area. At Kapunda drilling is required on the Hillside property, where there is a reasonable prospect of developing ore at a shallow depth in an area in which very little work has been done in the past.

2. Manganese mining.

There is scope for prospecting and testing areas beyond the limits of the known productive deposits, none of which is very large. It is work that is in progress today, and that can be done without heavy capital expenditure since the occurrences are shallow ones that do not call for a large outlay of money on plant. There is a domestic market at Whyalla for all the ore that can be produced, within the necessary limitations of composition. There is a market in Australia also for higher grade ore, if such can be found in a natural state or prepared by some method of beneficiation, for the manufacture of dry cells. Those who are engaged on the raising of ore of metallurgical grade are aware of the other market and are being encouraged to furnish bulk samples for testing with a view to beneficiation; but

they are taxed to the limit of their capacity to provide metallurgical ore at the present time.

3. Magnesium.

There are deposits of magnesite, that can provide a material tonnage of raw material containing over 90 per cent of magnesium carbonate, both near Copley and near Saltia. Large deposits of dolomite also are known to exist near Kulpara and Cowell. Both magnesite and dolomite are to be regarded as sources of the metal magnesium which is in rapidly growing demand for constructional work in which light metal is required. The present production of magnesium in New South Wales is on a small scale, and may well be only a fraction of what the future requirements of Australia will be. Two of the most accessible deposits of magnesite and dolomite are held by the B. H. P. Coy. Neither of the major dolomite deposits is being worked continuously today, and the output of magnesite from the Copley district is relatively small and a mere fraction of that which the deposit can provide.

4. Phosphate Rock.

An intensive examination of the area round Kapunda and Angaston has established on a firm basis large reserves of phosphate rock the phosphatic content of which is appreciable but with which iron oxide and alumina are associated in proportions that render the material unsuitable for manufacture into superphosphate. The details regarding these deposits are set out, with plans and the assay results of samples, in Mining Review No. 78, which contains also a discussion of the value of the material and its use in dressing pastures in districts receiving an annual rainfall of over 20 inches. Already a mixture in equal parts of superphosphate and finely-ground raw rock is being placed on the market at a price which, when compared with superphosphate, is equal to its agricultural value. This mixture is known as '50/50' phosphate and is expected to find a ready market in the country south of Adelaide.

In the preparation of the finely-ground raw rock The British Phosphate Commissioners have used the plant, equipment, and organization of the Adelaide Chemical & Fertilizer Coy. Ltd.,

which was adopted for the purpose although not designed for fine-grinding. It is felt that this arrangement is a temporary one, and that the preparation of the 50/50 phosphate will probably be abandoned by this company as soon as supplies of raw phosphate rock are again obtainable from Nauru and Ocean Island. Moreover the output of the grinding unit in the existing plant is so low that cheap grinding is impossible. The British Phosphate Commissioners have been supplied with a flow sheet and estimates of cost for a fine-grinding plant (see Mining Review No. 78 pp. 77 and 78) that may be expected to put through 100 tons every 24 hours, but have preferred to deal with the matter in the manner above-mentioned.

It appears to me that every effort should be made to maintain production from these deposits of relatively low-grade material along the lines now adopted, even when Nauru and Ocean Island raw rock can be obtained, since there is a definite use for the lower-grade rock and the application of this rock, either by itself or in a 50/50 mixture, should be a continuing practice in the treatment of pasture land.

In the event of the long continuance of the war in the Pacific region the practice of using raw rock should be well established in South Australia, and perhaps also in parts of Victoria and Tasmania.

Supplies are ample for all present requirements in the Kapunda district and there is every reason to expect that the reserves will be enlarged by the systematic exploration of other localities at which aluminous phosphate rock is known to exist, but at which work was abandoned when it was found that there was a high content of alumina present so that the manufacturers of superphosphate were unwilling to buy it.

In dealing with this suggestion it appears to be necessary to bear in mind not only the general economics of the present and future position so far as Australia is concerned, but also the possibility that the proposal may not be at first sight acceptable to the British Phosphate Commissioners or to the manufacturers of fertilizers. Yet, if a properly designed plant for fine grinding is installed, the cost of the ground raw rock can be made attractive

to those who require phosphatic material for dressing their pasture land. The provision of such a permanent plant is a matter which appears to me to demand attention as a possible post war development that will assist materially in turning to account domestic reserves. The capital cost of the plant, when viewed in relation to the tonnage already proved and to the probable existence of additional reserves, is not excessive.

5. Clay and ceramic materials.

The State's resources in clays of various types and in other minerals used in the ceramic industry are such that post-war development of this industry is worthy of encouragement. There are extensive deposits of china clay; ball clay; high grade silica, flint and felspar, all of which are being used on a small scale today. Calcite of excellent quality is available, and only fluorspar, of the minerals commonly used in pottery manufacture, would need to be imported.

To foster the development of this industry an experimental laboratory, in which the several products can be examined, treated and tested by burning, is required; and the laboratory should be under the direction of a specialist who has had both a scientific training and also practical experience in the blending of clays and the burning of these mixtures in pottery kilns.

At the termination of the war in Europe it should be possible to obtain the services of such a specialist from Great Britain, where the training of skilled potters has been in progress for some time.

The Canadian Government has installed recently a ceramic laboratory to carry out such work as is here envisaged, and, in my judgment, it would be unwise to embark upon any scheme for establishing a producing plant until extensive experimental work has been carried out.

6. Prospecting for new deposits generally.

The major difficulty inherent in any suggestion to assist

prospecting for new deposits is that concerned with obtaining the services of suitable and competent men. So far as this State is concerned it will be hard to find any really competent prospectors who are capable of examining a region for any mineral deposits which it may contain. We have had in the past some good men, but they have passed away and there has been a lack of men to take their place since other occupations have been more attractive. During the depression in the early 1930's many men styled themselves prospectors, and took up the search for gold which was markedly unsuccessful as much because of their inability and ineptitude as because of the State's deficiency in gold deposits.

In the post war period it is to be expected that quite a number of men will desire to take up prospecting, now that they have become accustomed to an out-door life and to the necessity for dispensing with luxuries and the attractions of the city. I feel, however, no little doubt about their ability to do useful prospecting unless they can be drafted into parties with more experienced men in charge. The experienced prospector tends, of course, to work alone and is intolerant of unskilled assistants, and can seldom be induced to work in an organization under trained men having a sound knowledge of geology and mineralogy.

The ideal way of examining any region for its possible mineral contents would be to have a combination of experienced prospectors with men who have been trained and who have had some subsequent mining experience. Systematic work on such lines has been done here by the B. H. P. Coy., but by no other organization so far as I am aware. If the work is thorough the waste of effort in repeatedly traversing the same ground - a common feature in many countries - would be avoided, and a proper record would be kept. I am aware of attempts that have been made in this State to find minerals in impossible places, and can give as examples the attempt to find diamonds in the Great Artesian Basin, in the belief that the blue shales of that basin are similar to the 'blue ground' of the Kimberly diamond pipes; or again the search for gold and silver in non-existant lodes beneath the bog iron deposits of Overland Corner on the River Murray. I have published a simplified geological map of the State to assist prospectors, but doubt whether much use has been made of it.

G. Lindesay Clark Esq.

If you have in mind any scheme of prospecting that will utilize scientific knowledge in conjunction with a systematic search for minerals of any kind that may exist within each area examined, such a proposal is deserving of all possible support.

7. The extension of drilling operations.

In the Moonta district, where a great deal of drilling is required and where only drilling can test the lodes, one of the serious handicaps that hamper prospecting is the character of the country rock which consists wholly of dense porphyry in which there ar innumerable closely-spaced joint planes. The hardness of the rock and its jointed nature make drilling slow. The normal rate of progre in this difficult country seldom exceeds 6 ft. and averages about 4 ft 6in. per shift. Fairly deep holes are required, as experience has shown that many of the ore shoots at Moonta do not reach the surface. A considerable area has been examined by geophysical methods and a number of sites selected for drilling, especially to the eastward of t the part of the field that has been the site of major mining operation It will be a very long time before these sites have been tested with the plants owned by the Department of Mines.

The drilling required on the Hillside mine at Kapunda cannot be carried out until a plant is available for the purpose, and it is hard to see when a drill can be spared in view of the work yet to be done at Wallaroo and Moonta.

Apart from such work as can be carried out by drilling from the surface it should be stated that there is scope for prospecting by drilling underground if an appropriate plant can be made available. At the present time it would assist the prospecting of talc and grephit to place an underground drill at work for proving the extent of the deposits.

Mention should be made of the fact that drillers competent to take charge of diamond drills are now extremely scarce, so that consideration must be given to the manning of a drill if one is provided for extending the work of prospecting by means of boreholes.

Yours faithfully,

DIRECTOR OF MINES.