

# THE RHODESIAN JOURNAL



## ECONOMICS

The Quarterly Journal of the Rhodesian Economic Society

Editorial Board:

A. M. Hawkins (Editor), M. S. Brooks, M. L. Rule, P. J. Stanbridge  
and P. Staub.

### INDUSTRY IN RHODESIA

#### A TWO-DAY SYMPOSIUM

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# THE RHODESIAN JOURNAL OF ECONOMICS

**PAPER No. 4**

**R. J. Hedley**

Mr. John Hedley, General Manager of Rhodesian Vanadium Corporation, is a past-President of the Chamber of Mines of Rhodesia.

INDUSTRY IN RHODESIA

INDUSTRIAL GROWTH AND THE MINING INDUSTRY

R. J. Hedley

No country needs much incentive to develop its natural resources to the best advantage, but the present uncertain state of the world, both economically and otherwise, lends tremendous impetus to the effort to become more and more self-supporting. The question which should be exercising the minds of those entrusted with economic development is the direction of those efforts, and the priorities which should be established to ensure a proper and integrated development of the natural and human resources at their disposal.

In Rhodesia minerals in the ground constitute one of the main sources of our national wealth and their proper exploitation lies at the roots of our economic development. We misuse these resources at our peril.

What then is the use to which we put the product of our mining industry? To what extent does it provide materials for the input base of the manufacturing and other sections of our domestic industry and impetus for their development? To what extent is the mining industry a consumer of the output from the remaining sectors of our industrial complex? Can mining provide additional materials for an extension of secondary industry? Is further internal beneficiation of raw materials produced by the mining section desirable and economically feasible? As I see it, these are some of the questions posed by the title of this paper.

For my purposes, I have adopted as a demarcation between mining and other industries; the United Nations' international system of industrial classification—the I.S.I.C. system. According to this system the extraction of ores is classified as mining and their further beneficiation as manufacturing. Thus the beneficiation of mineral ores included in manufacturing embrace smelting, refining and the ferro-alloy industry. Where vertical integration within a country has occurred, there is some doubt in my mind as to whether this is necessarily logical, and is, perhaps, unduly flattering to the manufacturing division. However, it is the system used in the National Accounts and accords with the concept of mining being a primary, and manufacturing a secondary, industry.

It is not surprising that in present circumstances statistics indicating the existing relationship and interdependence of mining and other domestic industry are difficult to come by. The most up-to-date and informative statistics are the modified input-output matrix and table of inter-industry transactions for 1965, to be found in the National Accounts and issued by the Central Statistical Office in 1966. The modified input-output matrix for 1965 shows that the total supply-demand of the mining industry, at the average "free on rail" value of output as shown in trade statistics, totalled £35.8m. A breakdown of this total is given on Table I. Exports, after adjusting for stock variations, accounted for £30.8m. or 86% of this total. Domestic industry took for intermediate consumption £3.5m. (the breakdown shown on Table I is from Table 60 of the National Accounts Matrix 2) and, with private consumption, represents 13%

of the total value of output. Gold is, of course, a final product to which special considerations apply but its elimination from the statistics would only reduce the percentage of mining output exported to some 82% of the total. It will be noted that in 1965 the percentage of output exported varied between 49% in the case of non-metallics other than asbestos to 96% in the case of asbestos.

#### **Mines produce mainly for Exports**

The "value added" by the mining industry in 1965 amounted to £23.1m. with inputs accounting for £12.7m. An analysis of the inputs will be found on Table II, which shows that £9.1m. (or 72%) came from domestic industry, whilst the remaining £3.6m. (or 28%) were from imports. This table also shows that the mining industry used £1.4m. of imports which were of merchandise competitive with domestic manufacturing industry.

In the same year the "value added" by industries directly aligned to mining, approximately totalled a further £7m.

Statistics subsequent to 1965 are few and sketchy. The "at mine" value of mineral production has advanced to £33.7m. in 1968 against £32m. in 1965. Purchases by the mining industry (as defined in the census of production) advanced from £6.9m. in 1965 to £7.4 in 1966, the last year for which statistics are available.

These statistics indicate that, in the main, the output of the mining industry goes to export, and in this way makes an important positive contribution to the balance of payments. However, they also show that mining provides to a significant extent, the input base of the manufacturing section of the domestic industry, and in addition markets for its output. These figures illustrate the inter-relationship which has grown between mining and secondary industry. There have been further advances in mineral production during 1967 and 1968; accordingly, there is likely to have been corresponding growth in the supply to and from secondary industry during these years. Additionally, the impact of sanctions and the introduction of import control have further strengthened the competitive position of the local manufacturing industry against imported merchandise. Whilst in 1965 these imports enjoyed 26% of the competitive market in mining, there are clear indications, if not firm statistics, that sanctions and import control have substantially reduced this percentage in 1969.

The future level of mineral production in this country will regulate mining's demands upon secondary industry. Whilst I do not propose to speculate to the extent of placing a value on future production it is germane to examine trends elsewhere and to relate them to our own situation. During the last few years the value of America's output of minerals has been rising at the rate of \$1,000m. per year to the present level of \$24,000m. annually. Over the past decade, it has increased by more than 20 per cent in physical volume. As a result shipments to the industry of machinery and equipment have more than doubled in that period. The equipment supply industry sold the mining industry \$600m. worth of primary products alone in 1968 and its total sales to mining were valued at \$775m. Despite these astronomical figures, there is concern in many quarters in the U.S. as to the source of materials to meet future demand. A world authority, Mr. John F. O'Leary, Director of the U.S. Bureau of Mines, postulates increases in U.S. demand by the year 2000 of 58 per cent for nickel, iron (70 per cent), chromium (100 per cent), tantalum and refined copper (200 per cent) and a 300 per cent increase for tungsten. The usage of others, and particularly the so-called "exotics" with special applications and specifications

required for the advancing technology of materials and design, are predicted to forge ahead far more rapidly. Since it is clear that mineral deposits in the U.S. will be unable to meet all these demands, it is reasonable to conclude that America will look to Rhodesia as a source of supply. The same must be true of the Far East and industrial Europe.

### **Base Minerals to the Fore**

To meet this demand, the accelerating trend in mining during recent years in Rhodesia has been away from gold and small-scale workings towards base minerals, in which field large-scale operations and tonnages predominate. Mining for asbestos, chrome, copper, iron ore, nickel and tin, and the possibility of platinoids in the near future, are all examples of this development. The extraction of ores from such operations call initially for sophisticated capital equipment, both mining and metallurgical, most of which it is presently uneconomic to produce in this country. However, there is scope for a wide range of feeder equipment. Rails, structural steel, electrical equipment including cable and motors, drill bits and mine cars are examples of such equipment already manufactured here and accepted in the industry.

Recently, facilities have been constructed to produce grinding equipment for ball mills and for steel castings, and these are but two examples of the scope available to manufacturers.

The mining industry is constantly on the look out for means of import substitution, and provided that the locally produced article is technically to standard and competitively priced, secondary industry will not find miners slow to make the change to local manufacture. The provisos are important. In large-scale operations where tonnage and grade are of the essence, equipment shown to be sub-standard and which causes breakdowns, delays and poor recovery, are to be avoided like the plague. A careful study of the potential market and its requirements, coupled with exhaustive tests to prove capability of performance, in which the Standards Association can be of inestimable assistance, are essential.

Price, too, is a decisive factor. Primary industry selling the majority of its wares in world markets at established world prices, cannot afford to featherbed local industry. Any reliance by secondary industry on import control protection, without regard to competitive pricing and quality is, I believe, dangerous folly. Inefficient production techniques and unrealistic profit margins which incubate under the hot-house conditions of protection result in an over-priced commodity being foisted on an unwilling market. Reluctant users of such equipment will do their utmost to secure alternatives and, to the extent that they cannot do so, will look with disfavour on those partly responsible for increasing production costs. Nonetheless, mining represents a growing market for secondary industry, and it is up to manufacturers to accept the challenges inherent in catering for it.

### **Local Processing Stimulates Growth**

Potential for industrial growth also lies in the field of increased beneficiation and local processing of the output from the mining industry. The advantages are obvious. A long-term source of a wide range of raw materials is at the country's disposal. An abundant source of semi-skilled manpower clamours for gainful employment and adequate power supplies—long term—are available. Development along these lines not only increases the gross domestic

product, but the additional value to the export portion of the output has consequential and beneficial effects upon the balance of payments. No wonder Government seeks to encourage such enterprise while congresses, and the like, pass appropriately worded resolutions with enthusiasm.

Asbestos, chrome, coal, copper, iron ore, iron pyrites and phosphates are already processed here to a greater or lesser extent, and the figures I have quoted indicate the progress which has been made in local utilisation and beneficiation of ores. The inherent difficulties, which have been overcome to implement this policy and to make this progress possible, are sometimes overlooked. For there are problems. Capital requirements are usually heavy and capital is a shy bird which all too easily takes flight for safer coverts. Entrepreneurs require the reasonable expectation of an adequate return commensurate with the degree of risk involved. Such returns are not always apparent in the processing, refining and fabricating fields. For example, there are three distinct sets of hands or processes through which most metal passes before its sale to the final purchaser, namely the miner, the semi-fabricator or processor and the end user. In the U.S.A. where industry is well documented, the median return on capital employed during 1967 was as follows:

Mining ... ..	..	..	..	16.4
Semi-fabricating ..	..	..	..	8.8
End user .. ..	..	..	..	13.0
Average for all industry..	..	..	..	11.3

(Source: Fortune Magazine—500 largest industrial corporations.)

Thus mining proved to be nearly twice as profitable—not only for the entrepreneur but in the national sense as well—as semi-fabricating and the latter generated a return which lagged well behind that achieved by the producer of the final product. There are grounds for believing that the risks taken by the semi-fabricator are not so much less than in the other sectors. Alloy production falls into the same group. As a result there is a tendency for greater integration of all three stages, with the impetus coming from the middle, in an endeavour to achieve for shareholders a reasonable return on capital outlay.

### **Inhibiting Factors**

However, where the mineral deposit is separated, geographically, from the consumer market, integration tends to be restricted to the remaining processes for technical reasons. Heat is necessarily a major contributor to cost of production in metal industries and therefore there is a development towards the combination of the intermediate and final phases of production in an integrated plant also located close to the consumer market.

Most local secondary industry seeks for its base a given and potentially growing internal market for its product, yet such is Rhodesia's present development that much of the benefited output of the mining industry has to rely entirely—or at the least unduly—on the export market. High tariffs or a system of quotas often exist or are introduced when foreign countries consider that their local industry is under pressure from imported goods. Governments find it difficult to resist such pressure, particularly when it can be argued that the country's national mobilisation base is put in jeopardy by a fall off in facilities for local processing caused by an undue volume of foreign importations.

Transport costs, too, hamper development for in Rhodesia's case the distances from producer to market are often great and freight rates have a tendency to increase, not only with distance, but with higher priced materials. Internally, sympathetic recognition of the problems involved usually secure reasonable rail charges, but shipping dues beyond our control are higher on beneficiated commodities than on raw materials and can go a long way to nullify the benefits of processing.

### **Mines Need Skilled Men**

Beneficiation also requires a high degree of technical skill and advances are made against a background of a world shortage of skilled engineers and technicians which is felt in this country as elsewhere. Progress will be hampered until such time as facilities for internal training reach the stage when we can meet our requirements for trained personnel from within our own borders.

Without a planned solution to these problems and a recognition of the limiting factors, increased beneficiation will not necessarily bring increased prosperity.

I have tried to show the fundamental relationship which exists between mining and secondary industry, particularly manufacturing, and to point to the extent to which this relationship is already being exploited in Rhodesia. Growth in the one stimulates growth in the other. Mining markets for manufactured products will increase; to take appropriate advantage of this growth the output of manufacturing offered to mining must match in quality and price the imported article, without artificial stimuli.

The export market is likely to remain the principal outlet for mineral ores in the foreseeable future. The cash flow generated by these exports will be essential to the overall economy and must be encouraged. Beneficiation, processing and fabrication will accelerate when the final product derived from mineral ores commands a significant internal market. The promotion of increased beneficiation to provide intermediate materials for the export market will depend upon the solution of problems connected mainly with capital and the provision of adequate returns upon it; whilst the needs and national susceptibilities of importing countries require careful study and must be catered for.



**TABLE I**  
**DISTRIBUTION OF TOTAL SUPPLY FROM MINING INDUSTRY,**  
**1965**

	£m.	£m.	% of Total
1. Exports (adjusted for stocks) .. ..		30.8	86
<b>2. Domestic Industry</b>			
<i>Intermediate Consumption:</i>			
Agriculture .. ..	0.2		
Basic Chemicals .. ..	0.3		
Non-Metallic minerals .. ..	0.2		
Iron and Steel .. ..	1.4		
Non-Ferrous Metals .. ..	0.2		
Other Manufacturing .. ..	0.3		
Electricity .. ..	0.1		
Transport and Communications ..	0.5		
Fractions .. ..	0.3		
	-----	3.5	
<i>Private Consumption</i> .. ..		1.1	} 13
3. Fixed Capital Formation .. ..		0.4	1
<i>Total Supply Demand</i> ..		<u>£35.8</u>	<u>100</u>
		£m.	%
			<i>Exported</i>
Gold .. ..		7.4	95
Chrome .. ..		3.7	84
Other Metallic .. ..		9.0	90
Asbestos .. ..		10.5	96
Other Non-metallic .. ..		5.1	49
Fractions .. ..		0.1	N.A.
<i>Total Supply Demand</i> ..		<u>35.8</u>	<u>100</u>

*Source:* National Accounts for 1965. Compiled and issued by the Central Statistical Office, July, 1966.

TABLE II  
TOTAL SUPPLY: DEMAND MINING INDUSTRY, 1965  
AND ANALYSIS OF INPUTS

1.		<i>£m.</i>				
	Inputs .. ..		12.7			
	Value added .. ..		23.1			
	<i>Total Supply: Demand</i> ..		35.8	(F.O.R. Value)		
2.	<b>Analysis of Inputs</b>		<i>£m.</i>		<i>£m.</i>	<i>% of Total</i>
	<i>Domestic Industry:</i>					
	Manufacturing .. ..		3.9			
	Electricity and Water .. ..		1.8			
	Transport and Communications .. ..		1.3			
	Distribution .. ..		0.7			
	Banking, Insurance and Finance .. ..		0.4			
	Government Administration .. ..		0.6			
	Other services .. ..		0.3			
	Fractions .. ..		0.1			
					9.1	72
	<i>Imports:</i>					
	Merchandise competitive with domestic manufacturing .. ..		1.4			
	Non-Competitive .. ..		2.0			
	Services .. ..		0.2			
					3.6	28
	<i>Total Input</i> .. ..				£12.7	100

*Source:* National Accounts for 1965. Compiled and issued by the Central Statistical Office, July, 1966.

## DISCUSSION OF PAPER FOUR

*Mr. Seisun* said that *Mr. Hedley*—like *Mr. Britten*—had brought up the question of the Standards Association. He asked why the Ministry of Commerce and Industry had failed to ensure that applicants for permission to establish new industrial projects be required to get Standards Association certificates. *Mr. Hamlin* said he was not an authority on this. However, he thought that although the Standards Association had grown tremendously in the last three years, it had not yet got to the stage where it could be of universal help to the government so that such a stipulation could be made in awarding new project approval.

*Mr. Hedley* commented that nonetheless the mining industry would always look with great favour on a supplier who did carry the Standards Association mark.

*Mr. Cummings* (Secretary for Commerce and Industry) explained that the name "Association" represented the getting together of industrialists to draw up standards for their own benefit. Government was careful not to force the use of the Standards Association. He thought that this should arise from within industry.

*Mr. Peter Staub* asked about recent statements by the Minister of Mines that the total value of mining output would reach £100 million in the 1970s. *Mr. Hedley* said all he was prepared to say was that he thought it was the job of Government Ministers to be encouraging.

*Mr. Bertram* said he thought that there was a suggestion in *Mr. Hedley's* paper of the vertical integration of the mining and processing industries. *Mr. Bertram* said he thought that such rationalisation could only be looked at in an enormous and highly developed economy like the U.S.A.

*Mr. Hedley* replied that he thought the argument in favour of such integration was in the hands of the company shareholders when that company is only involved in the semifabricating stage. The aim of that company would then be to try and get either into the mining process or the end-user stage in order to improve overall its particular share of the cake.

*Mr. Lacey* asked if *Mr. Hedley's* arguments meant that in order to exploit her mineral resources, Rhodesia would have to turn herself into an "open cast pit" for countries like the United States and Japan. If this were so, was this then the best way of developing Rhodesia's mining industry?

*Mr. Hedley* said he was sorry if he had created the impression that he would stop all beneficiation of minerals. All he had been trying to do in his paper was to point to some of the difficulties involved in increased beneficiation. *Mr. Hedley* added that in developing a natural resource a country sought to earn the foreign exchange it needed to pay for imports. He thought there was nothing wrong in exporting minerals in whatever form in which they found favour with the rest of the world.

*Mr. Dewhurst* said that *Mr. Hedley* had mentioned that the United States would not be able to meet demand for its own resources; he asked if *Mr. Hedley* had any information about the position of the other major mineral producers like Australia and Canada.

*Mr. Hedley* said that developments in both Australia and Canada in the last ten years had been quite fantastic. Better prospecting techniques, improved metallurgical extraction and new methods of extraction especially from oxide ores had improved the position tremendously. *Mr. Hedley* said that the O'Leary paper from which he had quoted suggested that the rate of industrialisation would outstrip the source of raw mineral supplies. From this point of view he saw no problem in exploiting whatever mineral resources Rhodesia had.

*Mr. Grieve* asked whether there was strong co-operation between employers and employees in ensuring technical progress.

*Mr. Hedley* replied that generally speaking the mining industry was pretty fortunate. There were two multi-racial Trade Unions both led by experienced and outward-looking people. The main problem was the worry on the part of the skilled artisan that his job was being fragmented. The Chamber of Mines was working to show that—rather to the contrary—the demand for their particular skills was growing. Progress was being made but greater and quicker progress was needed to ensure that Rhodesia did not suffer from a shortage of skilled people.

*Mr. McCombe* said he thoroughly agreed with everything said by *Mr. Hedley* and that everyone would like to see more beneficiation being carried out in Rhodesia. As he understood the position the capital required was very large and would mainly come from overseas mining companies. Such capital would have to come from Britain and America—especially America. As he understood American policy, the intention was to conserve its own mineral resources and keep labour employed so that as a result America would frown upon any beneficiation of minerals in a country like Rhodesia.

*Mr. Hedley* said he disagreed. Under normal circumstances capital would go where it could get the highest return, and national boundaries had very little to do with it.

*Mr. Peter Staub*, summing up, said he thought that the major development in mining in Rhodesia in the next twenty years would be in base metals.

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