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TABLE 3-4: WORLD NATURAL DIAMOND PRODUCTION 1969-1986 (CONTINUATION)
(MILLION METRIC CARATS)

ORIGIN	1979	1980	1981	1982	1983	1984	1985	1986
Total	47.98	47.21	45.53	47.05	57.18	63.87	66.54	89.6
Major Africa Producers total	34.58	33.81	32.18	33.7	37.78	44.88	46.16	47.05
Zaire	15.5	14.0	12.5	12.2	13.0	18.5	19.6	20.5
South Africa	8.6	8.7	9.5	8.9	10.0	9.8	9.9	10.2
Ghana	1.5	1.1	1.0	1.0	0.8	0.33	0.6	0.55
Angola	0.84	1.5	1.40	1.3	1.0	0.92	0.9	0.2
Sierra Leone	0.85	0.6	0.3	0.25	0.25	0.42	0.4	0.4
S.W. Africa (Namibia)	1.65	1.56	1.25	1.00	0.96	0.93	0.91	1.0
Botswana	4.4	5.1	4.96	7.77	10.7	12.9	12.6	13.0
Tanzania	0.34	0.35	0.37	0.38	0.37	0.36	0.35	0.3
Liberia	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4
Central Africa Republic	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.6

SOURCE: Mining Annual Review (1970-1987)

TABLE 3-4: WORLD NATURAL DIAMOND PRODUCTION 1969-1986 (CONTINUATION)
(MILLION METRIC CARATS)

ORIGIN	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
Ivory Coast	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.1	0.1
Other Countries Total	11.0	12.8	12.7	12.6	12.8	12.8	13.0	13.1	13.3	13.3
U.S.S.R	10.5	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Venezuela	0.2	0.6	0.5	0.4	0.5	0.5	0.6	0.6	0.8	0.8
Brazil	0.3	0.2	0.2	0.2	0.3	0.3	0.4	0.5	0.5	0.5
Australia	-	-	-	-	-	-	-	-	-	-
Other Small Producers	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

SOURCE: Mining Annual Review (1970-1987)

TABLE 3-4: WORLD NATURAL DIAMOND PRODUCTION 1969-1986 (CONTINUATION)
(MILLION METRIC CARATS)

ORIGIN	1979	1980	1981	1982	1983	1984	1985	1986
Ivory Coast	0.1	0.1	0.1	0.1	-	-	-	-
Other Countries Total	13.3	13.3	13.25	13.25	19.2	18.7	19.91	42.05
U.S.S.R	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Venezuela	0.8	0.8	0.75	0.75	0.25	1.0	0.85	0.85
Brazil	0.5	0.5	0.5	0.5	0.75			
Australia	-	-	-	-	6.2	5.7	7.06	29.2
Other Small Producers	0.1	0.1	0.1	0.1	0.2	0.29	0.47	0.5

SOURCE: Mining Annual Review (1970-1987)

TABLE 3-4: WORLD NATURAL DIAMOND PRODUCTION 1969-1986 (CONTINUATION)
(MILLION METRIC CARATS)

ORIGIN	1979	1980	1981	1982	1983	1984	1985	1986
Ivory Coast	0.1	0.1	0.1	0.1	-	-	-	-
Other Countries Total	13.3	13.3	13.25	13.25	19.2	18.7	19.91	42.05
U.S.S.R	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Venezuela	0.8	0.8	0.75	0.75	0.25	1.0	0.85	0.85
Brazil	0.5	0.5	0.5	0.5	0.75			
Australia	-	-	-	-	6.2	5.7	7.06	29.2
Other Small Producers	0.1	0.1	0.1	0.1	0.2	0.29	0.47	0.5

SOURCE: Mining Annual Review (1970-1987)

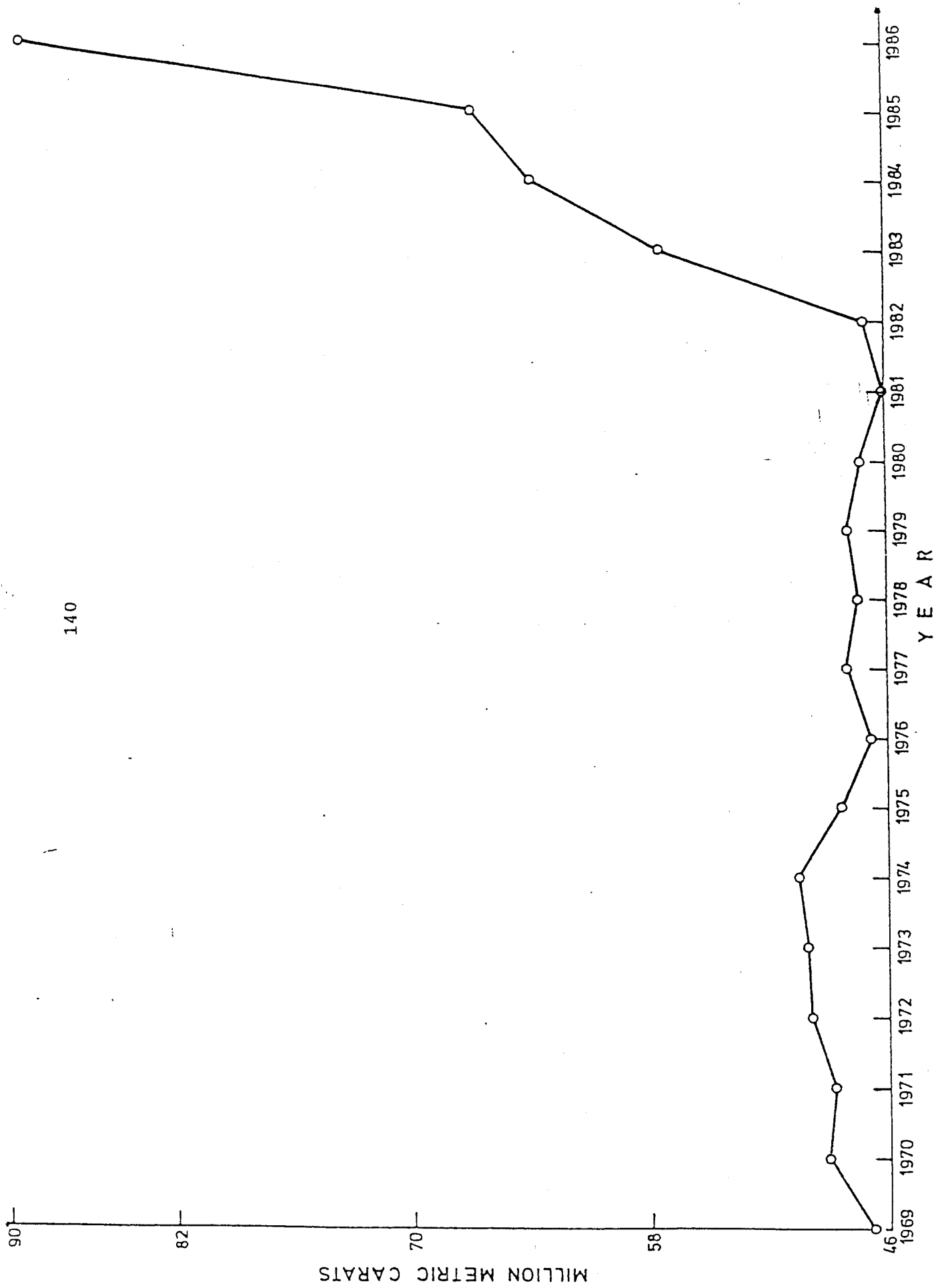


FIGURE 3-1 WORLD NATURAL DIAMOND PRODUCTION, 1969 - 1986

TABLE 3-5 AFRICA'S SHARE OF WORLD TOTAL PRODUCTION
OF DIAMONDS BY WEIGHT, 1969 - 1986*

(PER CENT)

YEAR	PERCENTAGE
1969	76
1970	73
1971	74
1972	74
1973	74
1974	74
1975	73
1976	72
1977	72
1978	72
1979	72
1980	72
1981	71
1982	72
1983	66
1984	70
1985	69
1986	53

SOURCE: Calculated from Table 3-1

* The share of Africa in "other small producers" is not included

47 per cent cheap gem and 33 per cent rare gem(27). The world's total production increased by 35 per cent in 1986 compared to the previous year. In 1986 Africa supplied only 53 per cent of the world's natural diamonds.

Zaire, South Africa and Botswana are by far the most important diamond suppliers from Africa and they have steadily increased their production over the period 1969 to 1985. Zaire remains the most important rough diamond producing country by volume in Africa. However, only about 5 per cent of Zaire's diamonds are of gem quality(29). Diamonds produced in South Africa and Namibia are about 40 per cent gem quality. From Table 3-4 Botswana has been at least the third largest diamond producer in the world since 1983.

Furthermore, Table 3-4 indicates that diamond production in some of the African countries is on the decline. Ghana, for instance, supplied 6 per cent of Africa's total production in the 1970's. By 1986, Ghana's production had fallen drastically to as low as one per of Africa's total. Ghana's problem is mostly financial. Production from Tanzania, Ivory Coast, Liberia and Angola have also fallen. The civil war in Angola accounts for its low production. Tanzania's situation is partly due to the policy adopted for the Mwadui mine in 1973, where the mine,s life was to be stretched in order to maintain the

longest possible life.

Production of Brazil and Venezuela appeared static over the entire period 1969 to 1986, nevertheless the gem quality of diamonds from these countries is high, an average of 50 per cent(29).

IV. Synthetic Diamonds

Synthetic diamonds have been used to supplement demand for natural industrial diamonds. The excreation of synthetic diamonds is achieved by crystallizing carbon under intense heat and pressure. The original synthetic technology was pioneered by a Swedish Company, Allmanna Svenska Elektriska Aktiebolaget (ASEA) in 1953 and was patented by General Electric in United States two years later. De Beers, perceived this as threat to their monopoly in the diamond industry, and therefore soon mastered the technique. De Beers present monopoly on synthetic diamonds is almost as it is in natural diamonds, General electric and De Beers control 90 per cent of the synthetic diamonds with each claiming the role of number one(30). The third producer, Tomel in Japan is very far behind the two. De Beers grip of the industrial diamonds business is due to its extensive research into new diamond uses at De Beers' Diamond Research Centre in Johannesburg.

3.2.3 Demand Side of Diamond Market Conditions

I. Consumption of Natural Diamonds

High quality natural diamonds like other gems are demanded for jewellery and investment purposes. The demand of diamonds for industrial use surpasses all the other gemstones, for the fact that diamonds is the hardest substance known.

In the twentieth century, diamond discoveries have continued and their demand has also grown substantially. There are several reasons for this increased demand. First, De Beers' control of rough diamonds has helped to maintain and build consumer confidence in the value of diamonds. Second, advertising by De Beers, its affiliates, and other organizations has made the public increasingly aware of diamonds as a symbol of love and success. According to Green(30), De Beers spend over 40 million US dollars annually on diamond promotion. Of this amount more than 15 million dollars (38%) is used for American campaign, 6 million dollars (15%), is used to woo Japan, and the remaining 19 million dollars for advertisement in other countries over the world. In addition, international political and economic instability and the two world wars have convinced many people of the importance of transforming at least some of their wealth

into concentrated, easily transportable forms. The increasing contact between the East and West, especially in Japan after World War II has opened new markets in countries where no diamond tradition such as giving engagement rings existed. Furthermore, the versatile industrial uses of diamonds have also created a growing vogue at the industrial level. These factors combined with the rising standard of living in industrialized countries after the second world War helped to create the present diamond market.

II. Demand of Diamond as Investment

De Beers have managed to woo people to believe its popular lauding; "Diamonds ... The Hardest Hard Money... Just as ancient man once used diamonds in amulets to ward off evil spirits, the modern investor can use diamonds in a portfolio to resist financial ills and offset the decline in value of US dollar, [and other international currencies e.g. Yen, Pound Sterling, Duestche Mark etc.] all of which threatens to erode accumulated wealth"(30).

Diamond prices have risen steadily over the years. Green(30), using 1930 as the basis, reports that diamond had risen 850 per cent by 1948. Furthermore, the surge in diamond prices in 1978 gave diamonds an exceptional performance. New York Times (30) reports:

While an Investment in General Motors Stock had gone up precisely 0.6 per cent, a one-year Treasury bill had yielded interest of 7.05 per cent, gold had risen 26.5 per cent, and the price of a house in Scarsdale, New York, by 32 per cent diamonds were up no less than 66.5 per cent.

In addition, the Economist Intelligence Unit in London, in a special study of precious materials as inflation shelters, predicted further price rises for diamonds in the early 1980s(30). Potential investors therefore, have come to believe diamond as an asset they can trust in an age of uncertainty

According to Green(30) worldwide investment alone in diamonds is over one billion dollars a year. He further reports that the American market for investment is at 500 million US dollars a year, the Far East, including Japan at 300 million, Europe about 200 million US dollars. France accounts for nearly half of Europe's diamond investment. The Middle East investment market is also at 100 million US dollars.

Most diamond investment is discrete, but the trend was clearly signalled early on the record prices set by the great auction houses; Sotheby's and Christie's, at sales

of fine jewels in New York, Zurich, Geneva and Mote Carlo. Sotheby's sold a 24.44 carat lilac pink diamond for 1.09 million US dollars to a Saudi Arabian jeweller at 44,564 US dollars per carat, while Christie's knocked down a 4.97 carat pink diamond for 305,000 US dollars, achieving a record 61,000 US dollars a carat, and also secured 581,395 US dollars for a 15.26 carat white diamonds, at 38,000 US dollars a carat(30).

Potential profits were underlined when Elizabeth Taylor sold for 2.5 million US dollars in 1979 the 69.42 carat cartier diamond which Richard Burton had originally bought for her at Sotheby's in 1969 for 1.05 million US dollars indicating a profit of 1.45 million dollars over 10 year period(30).

III. Demand of Diamond for Industrial Purposes

Diamond's toughness and hardness are unique assets for its industrial applications. The potential of diamond for industrial use was long overlooked, however at present industrial grade diamond is monetarily one of the most important items for international commodity trade. The range of industrial diamond application includes: electronics(fabrication of semi-conductor devices, heat sinks, quartz cutting); the metal working industry (manufacture and regrinding of tungsten carbide tools,

abrasive wheels dressing, turning and boring of non-ferrous metals, wire drawing); the glass industry (sawing, drilling and grinding of flat and hollow glassware), the ceramics industry (precision post-firing machining of almost all technical ceramics products); the stone industry (primary slabbing of large blocks, dimensioning, and polishing of building and masonry products); the Civil Engineering industry (test coring, core drilling for the installation of service ducts, sawing of prestressed building beams, safety grooving of concrete and asphalt roads and airports runways); the mineral industry (oil and mineral exploration drilling); the medical industry (the manufacture of surgeon's scalpel used for eye surgery); and the manufacture of thermistors used to measure the temperature of the stars. Demand for natural industrial diamonds however, has long outstripped natural supply(See IV under 3.2.2).

Industry bids for high quality diamonds as well. The exceptionally rare type 2a diamonds found at the Premier mine in South Africa for instance, are much sought after because of their excellent thermal conductivity. This property makes them very suitable in high-capacity miniature transmitters which carries television and telephone signals to and from satellites. One of the toughest assignment for a 2a diamond stone was when it served as the window of the American Space probe to Venus

in 1978(30). Diamond was the only material capable of meeting the requirements of strength, corrosion resistance, and optical transparency.

IV. Natural Diamond Consumption Analysis

Table 3-6 shows the net imports of polished diamonds over the 1970-1972 period. United states was the largest import of polished diamonds in 1970, closely followed by Japan. Hong Kong and Germany ranked third and fourth respectively.

Belgium, Israel, India and South Africa showed net exports. Most of them have large cutting capacities. Table 3-6 further shows that in 1972 Japan was the largest importer of polished diamonds with U.S.A. taking the second position. Over the period 1970-1972, Japan recorded the largest net import growth of 120 per cent. Germany, United States and Hong Kong showed net import growth of 63 per cent, 39 per cent and 35 per cent respectively over the period, 1970-1972.

The Mining Annual Review 1969-1983 declared United States as the largest free world consumer of all types of diamonds over the period. Japan and West Germany rank second and third respectively. Other major diamond markets in Europe include France, Italy and United

TABLE 3-6 NET IMPORTS OF POLISHED DIAMONDS 1970 - 1972
(MILLION US DOLLARS)

COUNTRY	1970	1971	1972
U.S.A.	78.4	83.3	109.3
Japan	76.4	187.5	168.4
Germany	47.2	63.4	77.1
France	16.2	16.1	NA
Australia	5.5	6.9	NA
Sweden	1.49	1.59	1.65
Denmark	0.63	0.51	0.39
New Zealand	0.76	1.0	NA
Mexico	0.78	0.23	NA
Canada	10.7	12.3	NA
Finland	0.282	0.215	0.485
Norway	0.319	0.453	0.505
Portugal	-45.1 ^a	-66.89	NA
South Africa	-80.39	-74.01	NA
Hong Kong	58.9	74.8	79.7
Belgium	-158.7	-145.7	-217.3
Italy	1.981	3.0	NA
Singapore	-1.0	0.5	NA
Malaysia	1.8	2.0	NA
Israel	-202	-265	-386
India	-37	-52	NA
Spain	0.32	4.43	NA

SOURCE: Mining Annual Review, 1975

a= The negative sign indicates exports

Kingdom.

Table 3-7 further shows the value and percentage distribution of the US \$14 billion spent at retail level in 1980. The share of United States of America and Japan exceeded 53 per cent

TABLE 3-7: WORLD RETAIL SPENDING ON DIAMONDS, 1980

COUNTRY	RETAIL SHARE	
	BY VALUE ^a billion U.S. Dollars.	PERCENTAGE
United States	4.50	32.10
Japan	3.00	21.40
West Germany	1.00	7.10
France	0.45	3.20
Italy	0.45	3.20
Other Countries	4.60	32.90
TOTAL WORLD	14.00	100.00

SOURCE: Green, T. The World of Diamonds, 1981

a 1 billion = 10^9

V. Consumption of Industrial Diamonds (Synthetic and Natural), 1972 - 1986

Table 3-8 shows the Western world consumption of industrial diamonds (natural and synthetic) over the period 1972-1986. Figure 3-2 shows this trend. It can be observed that there has been an increasing positive trend over the period. It is worth noting that since 1980 synthetic diamonds contribute 80 per cent of the western world industrial diamond consumption(28,30).

3.2.3 Trade and Trade Channels

I. Commodity Institution: The Central Selling Organization (CSO) of the De Beers Group

The rough diamond trade has been controlled for many years by De Beers. The Central Selling Organization (CSO), a member of the De Beers Group of Companies, markets about 80 per cent of total world rough diamonds production. This indicates a very high concentration and market power on the supply side. According to De Beers control of the industry is intended to avoid an over supply in the world market and consequently check price fluctuations and profit reduction.

In Economic theory a firm or industry like De Beers

TABLE 3-8 WESTERN WORLD CONSUMPTION OF INDUSTRIAL
DIAMONDS (SYNTHETIC AND NATURAL), 1972-1986
 (MILLION METRIC CARATS)

YEAR	QUANTITY
1972	55
1973	60
1974	65
1975	67
1976	80
1977	100
1978	100
1979	100
1980	100
1981	110
1982	110
1983	125
1984	150
1985	160
1986	170

SOURCE: Mining Annual Review, 1972-1987:

Green, The World of Diamonds, 1981

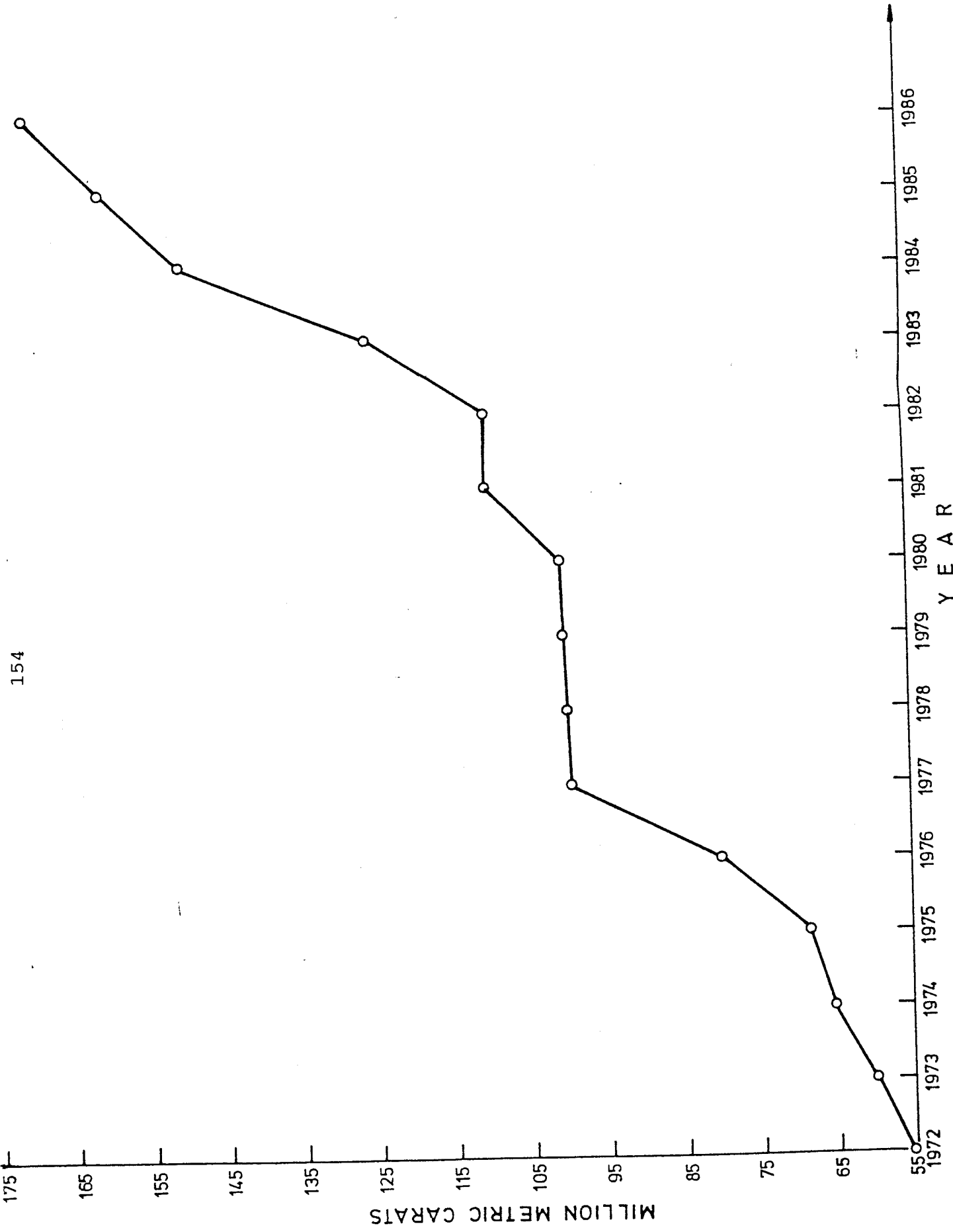


FIGURE 3 - 2 WESTERN WORLD CONSUMPTION OF NATURAL AND SYNTHETIC INDUSTRIAL

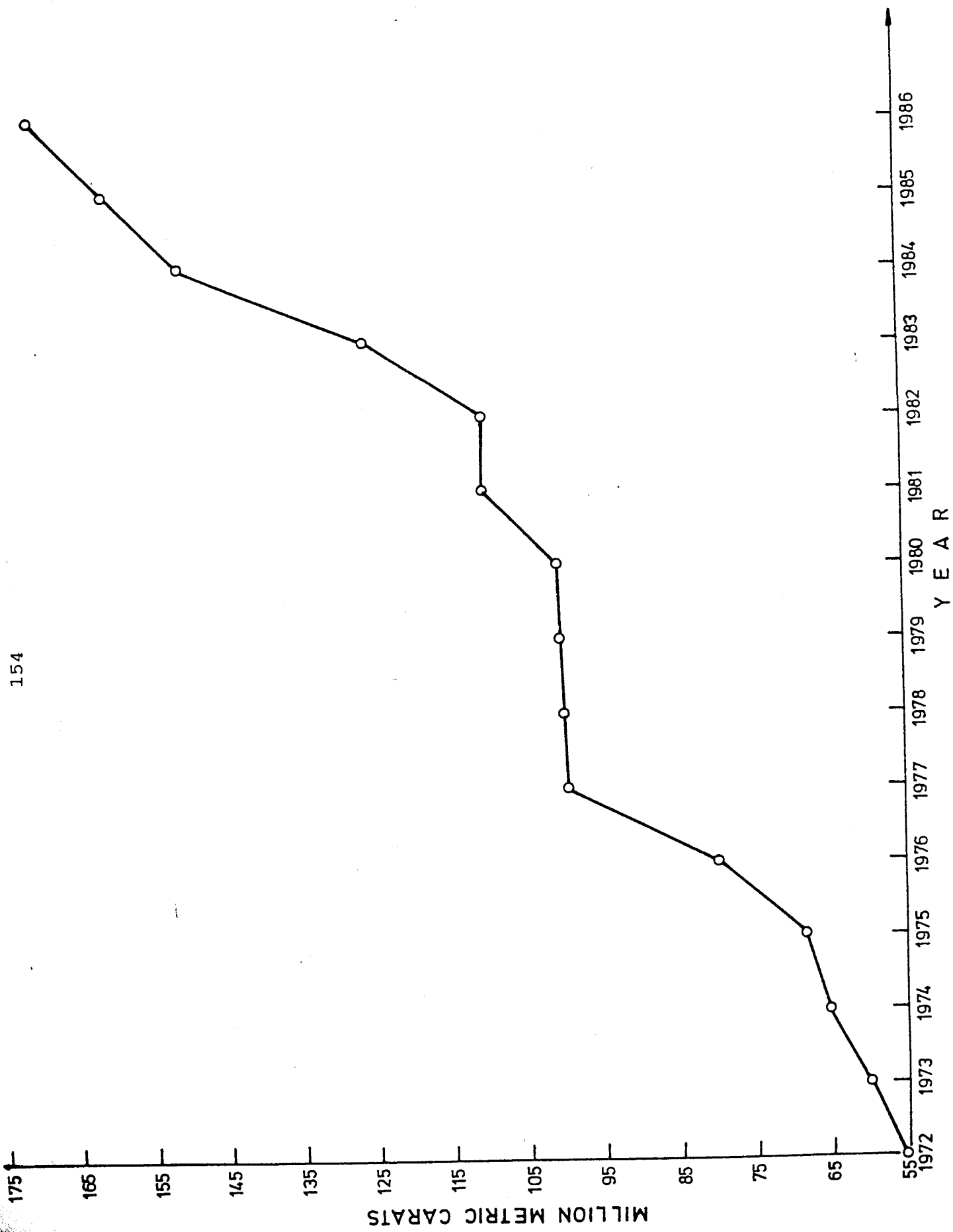


FIGURE 3 - 2 WESTERN WORLD CONSUMPTION OF NATURAL AND SYNTHETIC INDUSTRIAL

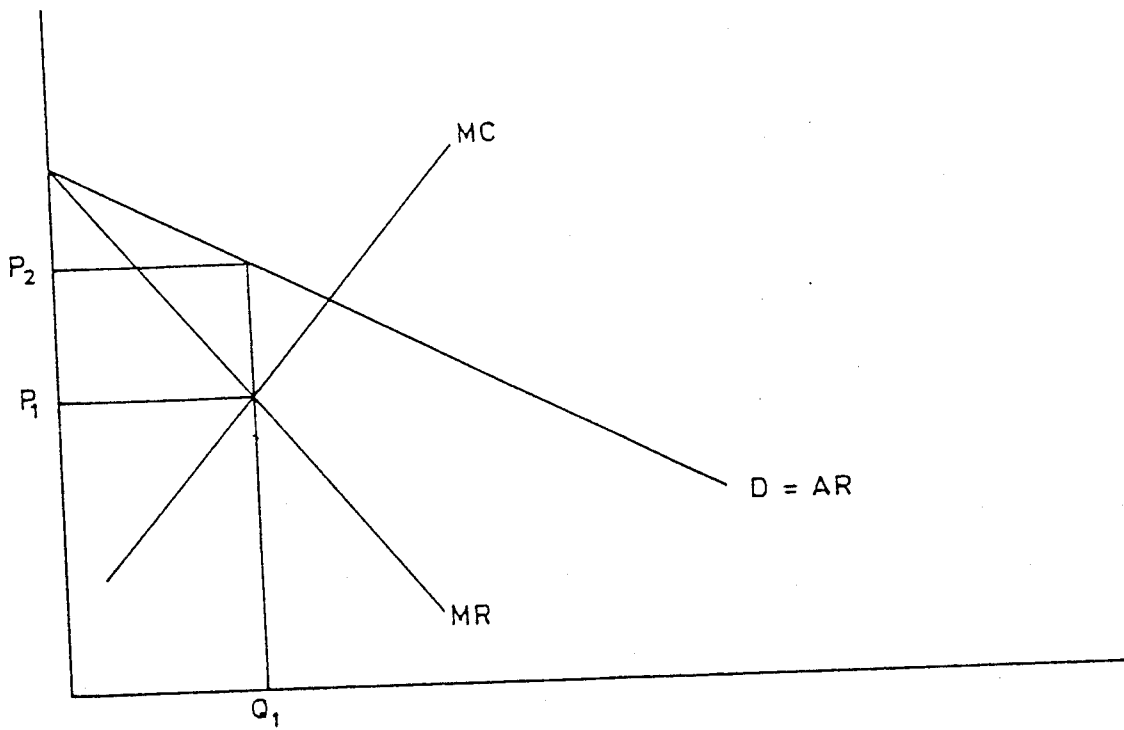


FIGURE 3-3 MONOPOLY EQUILIBRIUM

MR = Marginal Revenue
 MC = Marginal Cost
 AR = Average Revenue
 D = Demand
 P_i = Price i
 Q_i = Output i

exhibits monopolistic behaviour. We can apply the technics of the hypothetical monopolist to study the behaviour of De Beers. The concept is diagrammed in Figure 3-3.

II. Historical Perspectives

Cecil Rhodes initiated the policy that is today the basis of price control in the diamond market. He contended that the only way to control the wide fluctuations that could occur in diamond prices with inevitable variations in supply and demand was to control production at its source. The original policy of Rhodes has been maintained and strengthened by his successors, operating through De Beers Consolidated Mines Ltd., the same Company he established. The diamond market control has been acquired:

- (1) through the purchase of controlling interest in diamond producing mines, and
- (2) by persuading the owners of other mines not under direct control that it is better to sell fewer diamonds at higher non-competitive prices through organization than it is to permit free market operation.

The coercion has not been rapid because the amount fixed

by the organization, could, on some occasions, be smaller than the operator would realize on open market. However, the most convincing argument has been the increased profits accruing to those who sold their output to the early syndicate and the present Diamond Corporation.

The purchasing and consolidation of competing operators diamond mines by Rhodes was the first step in building of the diamond price structure. Chilvers(24) commenting on the diamond industry performance before the organisation laments;

The average worker in the mines at Kimberley, limited as to outlook, perturbed by the gradual fall in the prices of diamonds but ignorant of the cause of it, still went on overproducing, working his claims strenuously against his neighbours, ... digging into his foundations, making mining difficult and dangerous, the need for combination and centralization increased from day to day.

In 1873 Rhodes linked De Beers holding with that of Charles D. Rudd and the two brought up other claims. The eventual union with Robert Graham (1874), Runchmann, Hoskyns, Puzzey and other claim holders led to the formation of the De Beers Mining Company Limited, with a capital of £200,000 (24). In May 1887, Rhodes managed to

bring the whole of the De Beers Mine into the possession of the Company. In the initial stages, Kimberley Central Company a non-member of De Beers became so prosperous though it was selling on the open market. Barnato, the leader of the Kimberley Central Company became the main stumbling block to Rhodes' ambition. Rhodes however, worked strenuously to execute his ambition and at the age of 36, he controlled 90 per cent of the world's diamond production(24). De Beers Consolidated Mines Ltd., was incorporated in March 1888. In 1899, with the exception of the Brazilian production, De Beers was in control of all the important diamond production of the world, and the diamond syndicate was satisfactorily marketing De Beers stones. However, this ideal situation did not last for long, since new diamonds discoveries were to pose new problems which was to develop the second phase of diamond market control.

III. The Diamond Syndicate and their Success

A group composed of Barnato, Dunkelsbuhler, Mosenthal Sons and Company offered to purchase all De Beers diamonds after the incorporation in 1888. In 1890 a contract was again signed with an organization composed of ten firms including Barnato, Dunkelsbuhler, Mosenthal Sons and Company who owned 45 per cent of the shares together. This organization was given the responsibility to

purchase all diamonds of De Beers. In 1894 at at the peak of diamond prices, American demand for diamonds suddenly collapsed. The syndicate with a very large capital came foward to save the diamond market. Prior to 1914 De Beers had also assisted the syndicate in controlling the price of non-member diamonds by participating with the syndicate in purchases from Diamond Regie, a non-member. Although the successive syndicates had purchased De Beers diamonds, De Beers Consolidated had maintained a diamond committee that arranged sights, fixed prices, and considered offers from buyers. In other words, De Beers set its own prices. De Beers entered into long-term contracts with syndicates. For instance, a 5-year contract was signed in 1901. The syndicate in the terms of this contract, purchased De Beers production at the valuation of De Beers evaluator, and this evaluation remained unchanged for the full contract period. The syndicate took upon themselves the risk involved in price fluctuation during the period of the contract.

The great Premier mines was discovered in 1902 and the owners initially established their own marketing arrangements. However, a temporary break in diamond price taught the owners the soundness of the principle of cooperation rather than competitive selling. They therefore, embarked on an arrangement with De Beers and soon re-established prices. De Beers acquired the control

of the Premier mines in 1917.

IV. Events Leading to the Formation of the Diamond Corporation

A serious problem developed in 1908 with the discovery of small-size diamond deposits in German South West Africa (Namibia) which sold through the Diamond Regie, a semi-government organization of the German colony and a non-member of De Beers. However, in 1919 the Anglo American Corporation of South Africa Limited, headed by Sir E. Oppenheimer, acquired control of the German South West African fields and for the first time quotas were set with De Beers at 51 per cent, Premier 18 per cent, Jagersfontein 10 per cent and South West Africa 21 per cent. In addition, all sales was through the syndicate which had to bear all losses although the producers shared in the profits.

Greater problems of price and market control appeared with the great alluvial discoveries in Lichtenburg in 1925, and in Namaqualand in 1926. By 1927 the Oppenheimer syndicate had accumulated an unexpectedly large stock at £8 million due to the purchase of Lichtenburg diamonds, in order to maintain prices and to safeguard the interest of holders of cut diamonds throughout the world. Lichtenburg were in the hands of small workers and in 1929 supplies from these alluvial deposits were greater than all the mines under

De Beers Control, since De Beers had restricted production. By September, 1929 these sources, Lichtenburg and Namaqualand, had produced diamonds valued £14.7 million, much of which was sold by prospectors regardless of De Beers policy. Thus, before the great depression, the maintenance of diamond prices by the syndicate was straining its finances, and it became evident that it could not continue to maintain its huge stocks. Furthermore, the fact that Angola, Belgian Congo(Zaire), Sierra Leone and Gold Coast (Ghana) had become diamond producers and that the great depression occurred at that time(1929) called for immediate improvement in the structure that was rapidly becoming inadequate to control and maintain the world diamond market prices.

The syndicate then proposed to the Conference Producers the need for the producers to take 50 per cent interest in its "outside purchases" which include Angola, Belgian Congo (Beceka), Koffiefontein and Namaqualand. The Conference of Producers participation was: De Beers 32.5 per cent, Jagersfontein 5 per cent, Consolidated Diamond Mines of South West Africa 12.5 per cent. Premier did not assist. This led to the formation, in 1930 of a new Company which was to become the famous Diamond Corporation.

Sir Ernest Oppenheimer is considered founder of the Diamond Corporation. As finally established 50 per cent was owned by Oppenheimer and 50 per cent by the three Conference Producers in the following amounts: De Beers 32.5 per cent, Jagersfontein 5 per cent, Consolidated Mines of South West Africa 12.5 per cent. The Diamond Corporation was capitalized at £5 million and obtained another £5 million from sales of debentures(24).

V. The Diamond Corporation After 1930

The Diamond Corporation was to go through more difficult times. In 1930, the world depression resulted in the practical cessation of mining in South Africa and an agreement between the Producers Association and Diamond Corporation to halt diamond purchases by the later. Angola, Belgian Congo and West Africa agreed to modification of their agreement with Diamond Corporation.

Sir E. Oppenheimer, as a majority shareholder, had the right to appoint a chairman for the Diamond Corporation. He also became chairman of De Beers in 1930. In 1930-31 De Beers inspite of the prevailing economic situation, bought £2.4 million control of other mining companies. From Anglo American it bought the Consolidated Diamond Mines of South West Africa Limited and the Cape Coast Exploration company Ltd. From the Barnato Brothers in

addition, De Beers bought Jegersfontein. This gave De Beers control of all South Africa production except that of the Government of the Union of South Africa in Namasqualand and other alluvial production in the Union. Nevertheless, new problems developed, Dickson(24) reports;

The syndicate for many years was successful in obtaining almost complete cooperation from the Government but the new Corporation was compelled to meet new political situations in the Union of South Africa. Here the Government attempted to foster a South African cutting industry, and was disinclined to cooperate with the syndicate in a rigid control of new prospecting, exporting etc.

In 1932 De Beers closed its mines and the Corporation reduced prices on its rough diamonds to the prices of 1912, following the sharper decline of prices of major commodities, as a result of the 1930 depression. In 1933 the diamond Producers Association was formed. It consisted of:

- (1) the Government of the Union of South Africa, who had then agreed to cooperate for revenue sake and subsequently controlled all alluvial workings;

- (2) the Administrator of the Mandated Territory of South West Africa; as the custodian of the diamond interests in that Territory
- (3) De Beers Consolidated Mines Limited;
- (4) Premier (Transvaal) diamond Mining Company Limited;
- (5) Koffiefontein Mines Limited;
- (6) New Jegersfontein Mining and Exploration Company Limited;
- (7) Consolidated Diamond Mines of South African Limited
- (8) Cape Coast Exploration; and
- (9) the Diamond Corporation, was also given the status of a producer.

VI. The Formation of the Diamond Trading Company

In 1934 the new Producer's Association entered into agreement with the newly formed Diamond Trading Company to purchase and market the diamonds of the Association on a quota basis. This agreement included a quota to the Diamond corporation for its accumulated stocks. The Diamond Corporation's quota was to enable it to market gradually its accumulated stocks during 1929-34 period and to pave the way for other mines to resume operation. The production of Angola, Gold Coast, Sierra Leone, and Tanganyika (Tanzania) under contracts to the Diamond Corporation was shipped to Diamond Trading Company in

London and then sold under the Diamond corporations quota. Thus, Diamond Trading Company took over the marketing function from the Diamond Corporation.

Each member of the Producers' association was to receive a quota of the world's trade of the Diamond Trading Company after providing for the purchase by the Diamond Corporation the output of non-member producers. The Diamond Corporation however, continued with its exclusive purchasing contracts from all the other non-member African Producers.

The Diamond Trading Company was capitalized at one million Pound Stirling with power to hold a stock up to 2 million Pound sterling. This capitalization has increased substantially, thus further strengthening the financial resource available for the control of the diamond market. This makes it possible for the Diamond Trading Company to maintain its buffer stock.

In 1938 De Beers purchased the previously holdings of the Oppenheimer syndicate; thus De Beers and affiliated Companies now own the Diamond Corporation. A later arrangement divided this ownership 80 per cent to De Beers and 20 per cent to Consolidated Mines of South West Africa, which is also controlled by De Beers.

When the agreement between Diamond Producers Association and the Diamond Trading Company was renewed on January 1946, a new world selling agency, Industrial Distributors Limited was established to take over the sales of industrial diamonds, leaving the Diamond Trading Company the sale of gem diamonds only. One of the principal reasons for this was that industrial diamonds, which are solely commercial utility commodity, call for an entirely different method of sale from that of gems.

VII. Summary of De Beers

De Beers is the most important producer of gem diamonds. As a buffer stock holding company, it maintains control of diamond prices through subsidiary companies. This control is achieved by contractual arrangements to buy the output of all the important world diamond mines. Prices and quotas are set at a level that permits all present producers to conduct their operations profitably, at least when business conditions are reasonably good. The financial structure is so sound that maintenance of the value of diamonds, even in times of economic setbacks, is as stable as possible.

The prices that De Beers set on its own production has the effect of determining the price levels that the other producing countries receive. So far the other producers

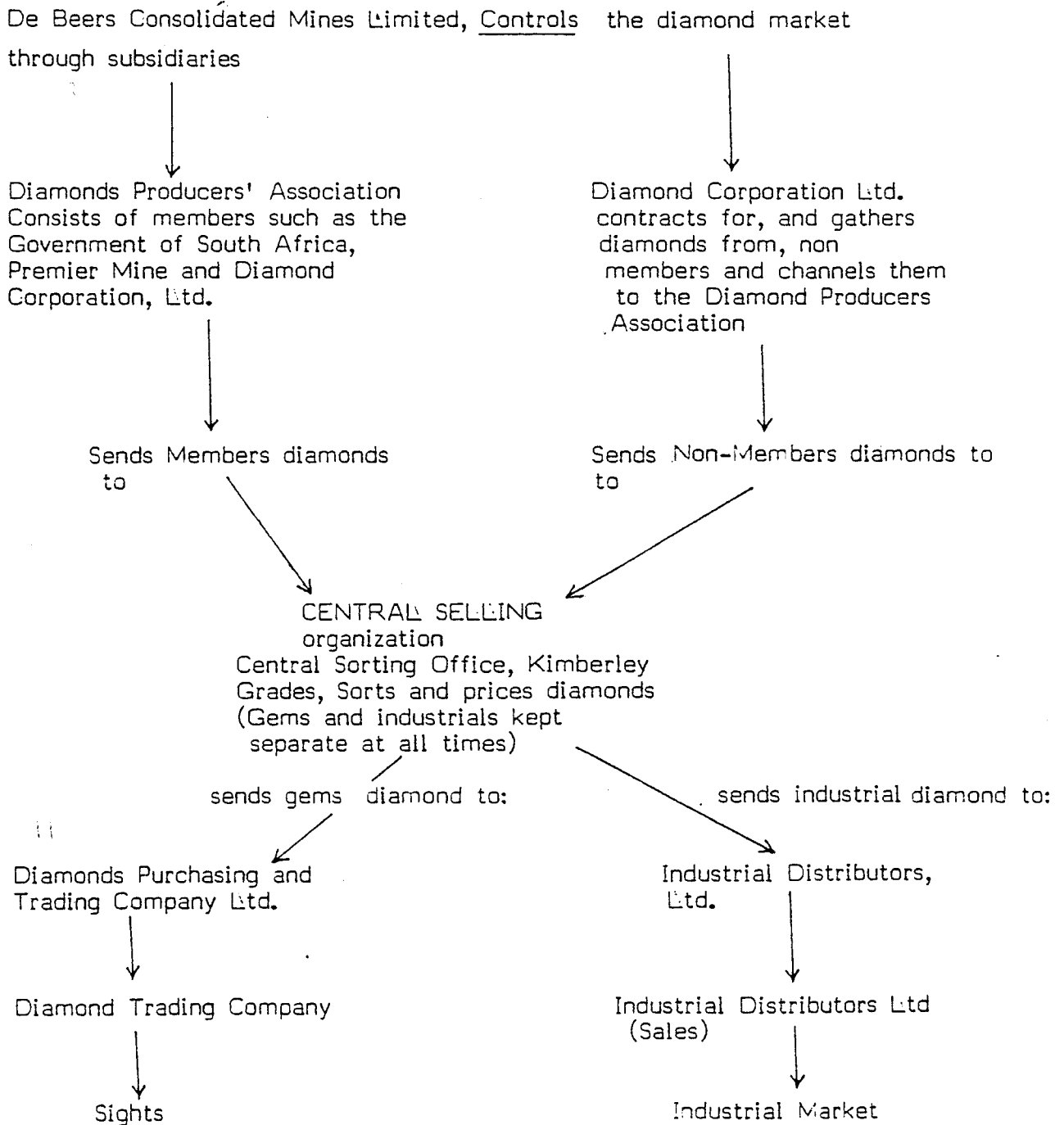
have found the price fair and reasonably stable to remain without the structure. De Beers therefore, enjoys a price leadership role in the diamond industry.

With the exception of the diamond production of the U.S.S.R., Ghana Consolidated Diamonds, Sierra Leone Selection Trust (SLST), Venezuela, Brazil, Guyana and minor production from other countries of the former French West Africa, all diamonds are sold through the Diamond Trading Company and Industrial Distribution Limited (see Figure 3-4).

VIII. De Beers Recent Performance

Most rough diamonds have for more than 50 years been sold through the Central Selling Organization (CSO) of the De Beers, which acts as the distributor from the miners to the cutters. The main objective of the CSO is to meet the particular preferences of the cutting centres from available rough diamonds production. This is an extremely complicated task, due to the fact that rough diamonds vary in terms of shape, size, quality and colour and by mine. Besides, diamond cutters tend to specialise according to their respective skills and local production costs. The CSO therefore, has the assignment of sorting diamonds into more than two thousand categories (31).

FIGURE 3-4 MARKETING FLOW OF ROUGH DIAMONDS
FROM MINES TO SIGHT

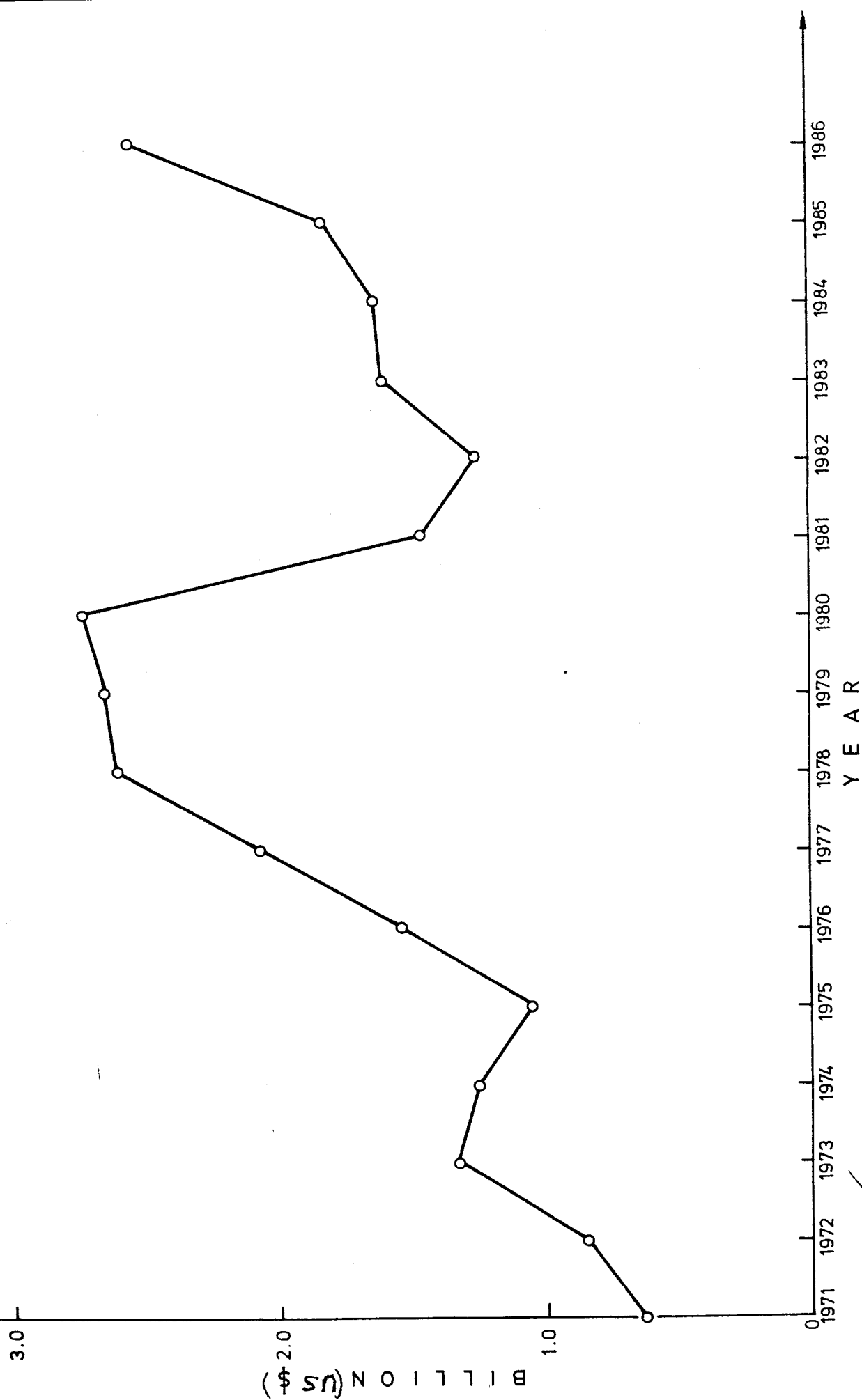


Due to the specialisation within the cutting industry, the production of particular types of diamonds can sometimes exceed the capacity available to cut and polish them. Fluctuations in the economic outlook of the main consumer markets in the developed countries can also lead to temporary reduction in the demand for diamond in general. The demand for rough diamond may therefore, be temporary affected. It is on such occasions that, to benefit the participants of the diamond industry, the CSO maintains its purchases while at the same time holding in stock those categories for which there is no immediate demand. These stock diamonds are sold as soon as demand is restored or suitable cutting capacity becomes available. The CSO also encourages the cutting centres to adapt to changes in the proportions of different types of rough diamonds coming from the mine.

The financing of buffer stocks as well as normal working level of stocks, relies upon the large financial resources which the CSO has built up for this purpose over many years. The working stock of the CSO has grown with the general expansion of the diamond business. For the period 1980-1985 CSO's stocks rose by approximately 1 billion US dollars(32). The CSO's financial strength therefore is of great importance to the diamond industry's price stability.

Figure 3-5 shows the trend of the CSO sales of gem and rough diamonds over the period 1971-1986. Table 3-9 shows the value of these sales. The performance of CSO and therefore that of the diamond industry over the period could well be understood by analysing the factors which tailored the trend of CSO's sales over this period. The general trend has been the increase of CSO's sales since 1971, apart from sales decline in 1973-1975 and 1980-1982.

Over 1971-1973 period a wider demand and ownership of diamond jewellery throughout the world was the underlying reason for CSO's increase sales. Demand of jewellery for instance in Japan and Germany was very substantial. In addition, there was growth in consumption of industrial diamond over this period. The strong demand in 1971-1975 enabled CSO to increase the price of all gem and near gem diamonds by an average of 6 per cent in 1972(29). The decline of CSO sales in 1973-1975 was due to the following: The Middle East War in 1974, forced the cutting industry of Israel to close down. The complete shut down in Israel created uncertainty in other major cutting centres. The related oil crisis in 1974-1975 also brought a downturn in the economies of the major industrial countries, accounting for the falling off of demand for diamonds. Besides, high interest rates and over ordering at retail level also contributed to the decline in the industry's performance over 1974-1975.



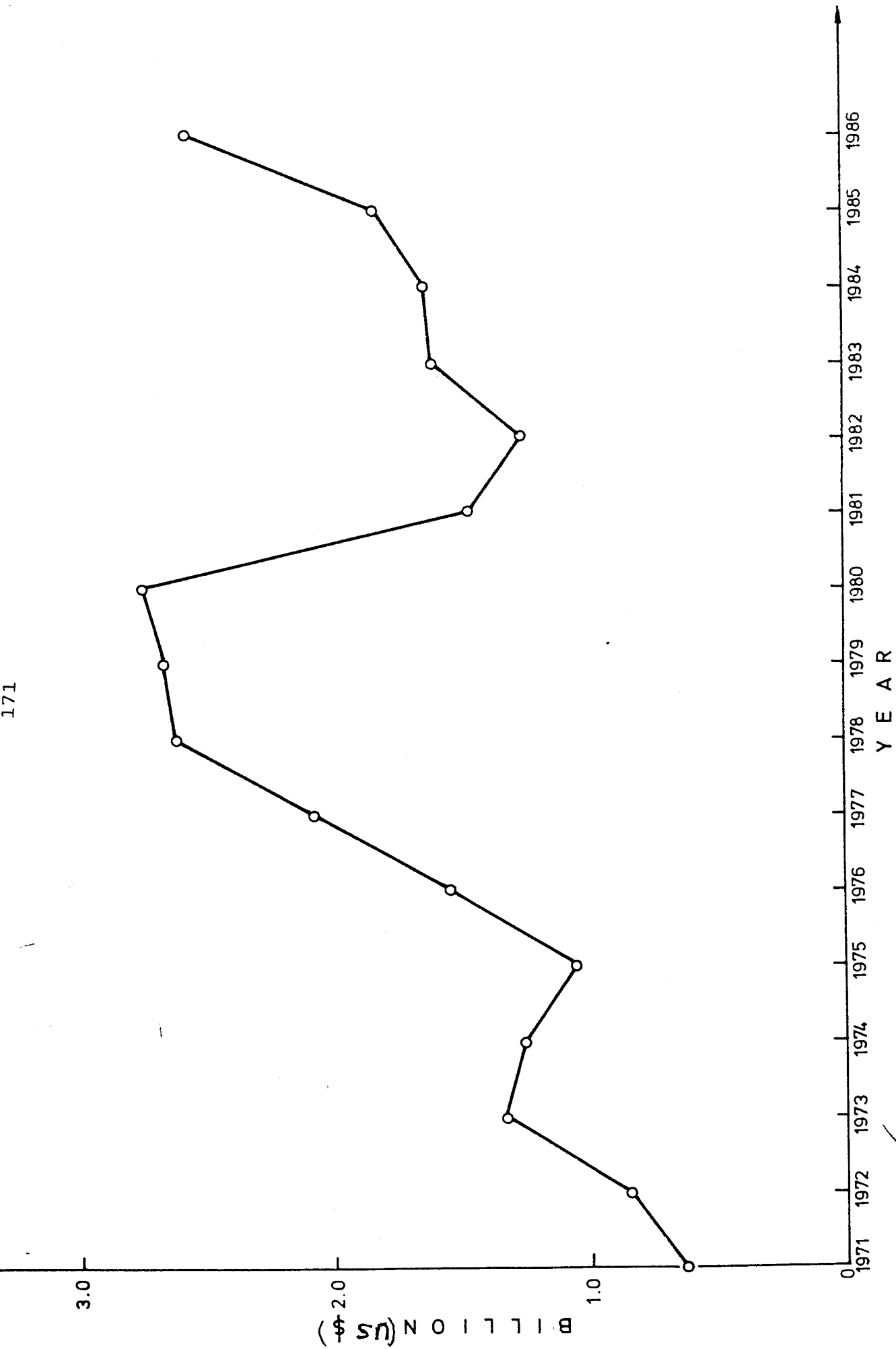


FIGURE 3-5 CSO SALES OF GEM AND INDUSTRIAL DIAMONDS

1971 - 1986

TABLE 3-9 CSO SALES OF GEM AND INDUSTRIAL DIAMONDS
BY VALUE 1971 -1986
 ('BILLION US DOLLARS*')

YEAR	SALES
1971	0.63
1972	0.85
1973	1.32
1974	1.25
1975	1.06
1976	1.55
1977	2.07
1978	2.60
1979	2.65
1980	2.73
1981	1.47
1982	1.26
1983	1.60
1984	1.61
1985	1.83
1986	2.56

SOURCE: Mining Annual Review, 1973-1987

* 1 billion = 10^9

The years 1976-1979 was a bonanza period for the diamond industry. In general there was a substantial growth of demand for diamond jewellery. The improved world economic condition in 1976 resulted in a considerably improved demand for industrial diamonds. CSO sales increased by 46 per cent in 1976 against the the previous year. 1977 saw an unprecedented increases in CSO sales and prices with increases of 33 per cent and 34 per cent respectively compared to 1976(33). According to De Beers(33), regarding CSO price increases in 1970s and taking 1979 as 100, the index stood at 235 at the end of 1977. The good performance in 1977 has been attributed to a good all round demand for diamond jewellery as well as speculative trading in the cutting centres. On the contrary, De Beers argued that such unprecedented demand was unhealthy and unsound for long-term stability of the diamond industry. De Beers therefore, took the necessary steps in 1977 to reduce the premiums which prevailed in the cutting centres and "flushed out" the diamonds which were being stockpiled at the cutting centres. Demand of industrial diamonds also increased steadily in 1977. The boom continued into 1978. Demand remained strong especially for large diamonds in 1978 and early part of 1979.

The effect of high interest rates which was prevailing in 1977 reached record levels in the early part of 1980.

This high interest rates brought an increasing financing problems at the cutting centres, who finance a considerably portion of their stocks through bank credits. The recession in 1980 adversely affected the diamond industry and demand in general weakened progressively throughout the year. Stocks of polished diamonds overhanged the industry at the cutting centres and further down the pipeline. The situation was worsened further by high interest rates in 1980. Consequently, CSO's diamond stocks rose by 70 per cent in 1980 compared to 1979(34). Furthermore, in this critical situation, Zaire was considering breaking from CSO in 1980. Zaire did break with CSO in 1981. When Zaire broke away from CSO, Australia's position regarding its estimated production of 150 million to 200 million dollars in 1985 also became clearer(35). Against the background of sharply reduced CSO sales there was genuine fear of the effects of Zaire and Australia upon De Beers ability to maintain its control of the diamond industry. CSO sales therefore fell substantially by 46 per cent in 1981 against 1980 sales (see Figure 3-5), resulting in the virtual doubling of De Beers diamond stocks. De Beers therefore reduced production at some of its mines because of the market conditions which prevailed. The overall world diamond production as a result fell by 1.68 million metric carats to 45.53 million metric carats in 1981 (Table 3-4). The fall in demand in 1981 was for larger

better quality diamonds noticeable in the investment markets(35). During 1981 therefore, there were consistent reports that diamond prices have fallen. This was based on the price performance of the one carat D-flawless polished diamonds - top colour, top quality(35). This category of diamond is very rare. Best estimates(35) suggest that less than 100 of these diamonds are produced each year. On this basis fluctuations in its price was unrepresentative of general diamond prices.

The distressing year for the diamond industry in 1981 further continued into 1982, both gem and industrial diamond sales declined during the early part of 1982. The situation however, improved around the mid-year and the sales in the first half of 1982 were 17 per cent higher than the second half of 1981. The second half of 1982 brought a marginal improvement. Thus, the outlook of the diamond industry became more optimistic. This better outlook was enhanced by:

- (1) The falling interest rates and the rise in the gold price;
- (2) The start of bull markets in Wall Street and other stock exchanges(26).

Consequently, demand for diamond jewellery revived. Stocks in cutting centres reduced together with bank

indebtedness. CSO's buffer stock policy made these effort of the cutters possible. Subsequently, shortage of rough diamonds of the cheaper lower quality diamonds resulted. CSO therefore, increased the price of this category of roughs in September 1982. Furthermore, in the first quarter of 1983 there was increased demand for all qualities and CSO sales increased in the second quarter of 1982. De Beers Chairman(35), as an indication of relief endorsed; "While a rapid return to prosperous conditions is not to be expected, it could, I think, be said that short of a further setback in the world economy, a solid base has been established from which a gradual improvement in sales and profits can reasonably be hoped for".

In March 1983, 22 months after leaving CSO and selling the diamonds from Miba mine to three independent firms, Zaire renewed its exclusive contract to sell these diamonds once more to the CSO. The improved diamond trade continued into 1983 and real CSO sales increase was achieved during this non-inflationary period.

On the production front, the total natural diamond production in 1983 rose by 21.5 per cent to 57.18 million metric carats(Table 3-4). The principal contributors to this increment were;

- (1) Australia's first commercial output from its alluvial source, and
- (2) an overall increase in production from some of the South African mines.

Since the CSO handles about 80 per cent of annually mined diamonds (27,28), one would have expected its stocks to have increased substantially, given this level of the world's diamond production in 1983. On the contrary, the Mining Annual Review(36) reports just over 10 per cent increase in CSO stocks in real terms.

The trend in 1983 however, did not continue into 1984, though retail diamond reached peaks in 1984. There were difficulties in the market for rough diamonds and sales increased only by one per cent compared to the previous year. As a result of the appreciation of the United States dollar against other currencies and the rationalization policy embarked on by the banking institutions who were incurring losses in financing the diamond trade, conditions in the cutting centres became difficult(37).

Nevertheless, De Beers in this year(1984) reported that during the last 5 years diamond stocks in the cutting centres had fallen by nearly 5 million dollars and jewellery manufacture's stocks had likewise fallen

significantly. The reduction of stocks in the pipeline had been affected through CSO's rough diamond policies. By 1985, CSO's stocks had risen by approximately one billion US dollars(32). In contrast to the gem side of the industry, industrial diamonds demand increased in 1984.

In 1985, the year when the Tin and OPEC cartels were in disarray, CSO however, announced a further increase in its sales of rough gem, an increase of 13 per cent against the previous year. As at 1985, operations were running at acceptable levels again at all stages. The rough market stabilized and demand was showing encouraging signs of broadening into those qualities which CSO has until then been forced to stock. To confirm this encouraging underlying trend, the CSO in 1985 announced a price increase for rough gem diamonds by an average of 7.5 per cent(32). In 1985 the world retail diamond jewellery sales continued to grow and exceeded the 1984 record by some three per cent. During 1986 CSO reported the restoration of normal profitable trading in all sectors. Sales of rough gem and industrial stone increased by 40 per cent compared to 1985. Demand for rough diamonds came back in balance with production from its mining source around the world. There were also an average total price increase of 14.5 per cent in 1986. There was an increase demand for better quality diamonds of one carat or more

especially in Japan following the Yen appreciation against the dollar. In addition, CSO's rough diamond stocks showed a further reduction during 1986 and now total 1.8 billion dollars(28)

In brief, over the period 1971 to 1986, the diamond industry operated reasonably well. Between 1980-1985 however, CSO had to cope with excessive stockpiling. As a result, CSO's stocks rose by approximately 1 billion dollars over the period 1980-1985, while at the same time stocks of rough and polished diamonds in the cutting centres reduced approximately 5 times this amount(32). The diamond industry showed a considerably growth in 1985 and 1986. CSO's rough diamond stocks showed a further reduction during 1986 and now total 1.8 billion dollars. The CSO affirmed in 1986 that it is willing to hold stocks at a higher level than previously so as to be in a position to dampen speculation, should the need arise.

3.2.4 The Structure of the American Diamond Market

As previously discussed United States is the largest consumer of all types of diamonds. Large diamond business firms in United States purchase their own rough diamonds directly from the Diamond Trading Company. Small-scale diamond cutters and importers however, work through

brokers to obtain their rough stones. Brokers charge about 1-2 per cent of the purchase(24).

The major variation in cost of diamonds come in the cutting(24). Lower labour costs permit a substantial saving in the cost of cutting diamond outside United States, yet the lower costs saving are largely offset by heavy import duty imposed by the United States Government on polished goods entering the country(24). No duty is however charged on rough stones(24). Labour represents a decreasing proportion of total cost as sizes of rough diamond increase, therefore, large stones may be cut economically in the United States. Slightly smaller stones may be competitively cut in Puerto Rico since labour cost are lower than those in United States(24). There is no duty on goods from this United States territory(24).

I. Classification of diamond Distributors in the United states

There are 4 principal groups that handle the distribution of diamonds in United States. They are:

- (1) The cutter, importer, wholesaler;
- (2) the importer, wholesaler;
- (3) the wholesaler, and
- (4) the jobber.

A. The Cutter, Importer And wholesaler

These distributors may operate from different centres. They may maintain cutting plants only in the following places;

- (1) United states or its territories;
- (2) Europe, or
- (3) both Europe and the United states.

Others, however do not own cutting plants and contract to have their stone cut abroad. These groups however, advertise themselves as cutters on the American diamond market.

Even within the Cutter-importer-wholesaler group with the largest average size, many of the firms work through brokers rather than buying CSO sights.

B. The Importer And Wholesaler

This group of distributors buy diamonds from either local cutting plants or abroad. Some of them sell their diamonds only to manufactures and non-importer wholesalers, while others sell directly to the retail jewellers.

The business of an importer-wholesaler may be limited to a single individual. The individual may travel and offer merchandise to retail jewellers, over a wide area, or he may act as a broker and import by small lots for specific retailers or chains of retail organizations.

Since many wholesalers are not in a position to contract the entire output of cutting plant domestically, the large scale cutters in United States usually sell out diamonds to wholesalers at import prices. These large scale cutters remain as principals in their operation, and as a result maintain such safer margin. This is the reason why American wholesalers who buy on the European market are not necessarily obtaining bargain prices. In addition, the importer's sale might have passed through the hands of many brokers on the external market.

C. The Wholesaler and the Jobber

Diamond represent only a small part of the business carried out by either the jobber or general jewellery wholesalers. They may include these mainly as a service to their customers.

According to the Gemmological Institute of America(24), in some instances, the prices will be competitive with those of other diamond importers, wholesalers and cutters. The retailer in addition, have to pay for the services offered by these distributors. Ring manufactures are also important source of diamonds to retailers. Ring manufactures may function as any of the four main group of diamond distributors. A large number of retailers handle so few sales that they do not consider it worthwhile to hold stocks of loose diamonds and mountings. The distributors also embark on advertisements and often handle trade marks. However, the statistics of the relative concentrations of these distributors was not available.

3.2.5 The World Diamond's Market Structure

The structure of the world diamond market can be characterized as follows-:

- (1) Diamonds are traded mainly at the rough and cut stage.
- (2) The diamond market is one of mineral commodity markets which exhibits both monopolistic and monopsonistic characteristics.

The central selling Organization (CSO) of the De Beers control about 80 per cent of the rough diamond supply(27,28). The CSO monopoly of the diamond market has been made possible by most major diamond producer's willingness to sell their output to the CSO. This is a behaviour due to the high concentration of the world diamond market. CSO operate a buffer stock system.

- (3) There is a high concentration of diamond production in Africa and recently in Australia. Cutting and manufacturing of diamonds take place mostly in developed countries, and is limited to few countries.
4. There is high competition at retail level. This is also because of the high concentration of the world diamond market.

I. Organisation and Concentration of the World Diamond Market

Each customer of the CSO purchases every month at a

'sight' a box of diamond containing stone of each category of diamonds. Some are later sold in the Secondary market by the customers. Trade of diamonds also takes place at auctions and at International Trade Fairs. Most members of the diamond communities in the cutting centres finance a considerable portion of their stocks with bank credits and their activities are strongly influenced by De Beers.

CHAPTER 4

4. THE GEMSTONE INDUSTRIES IN ZAMBIA, ZIMBABWE AND TANZANIA

4.0 The Gemstone Industry in Zambia

Introduction

Modest commercial gemstone mining in Zambia began in the 1950s with the mining of amethyst at kalomo. In the 1970s Zambia emerged as an important source of emeralds and other coloured stones as a result of the discovery of emerald in the Kafubu area. Figure 4-1 and 4-2 show the distribution of coloured stones in Zambia.

4.1 Amethyst

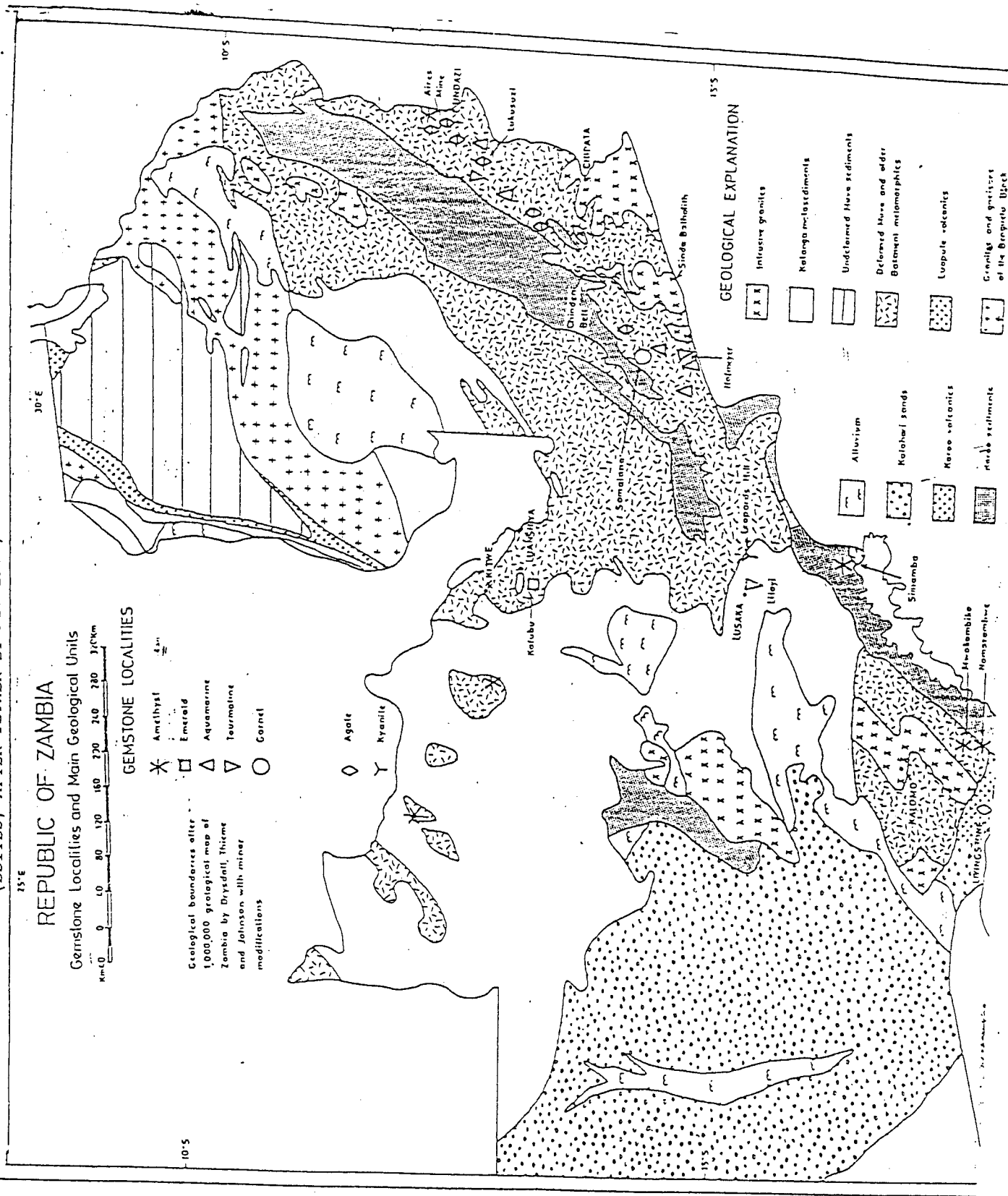
4.1.1 Resources

The major deposits of commercial importance in Zambia, are situated in the Southern province and are located at, Mwakambiko, Namazambwe and Simamba (Figure 4-1 and 4-2).

Mwakambiko lies in north of the Northern mid-Zambezi graben structure in which sedimentary Karoo rocks are found. The host rocks are biotite and hornblende

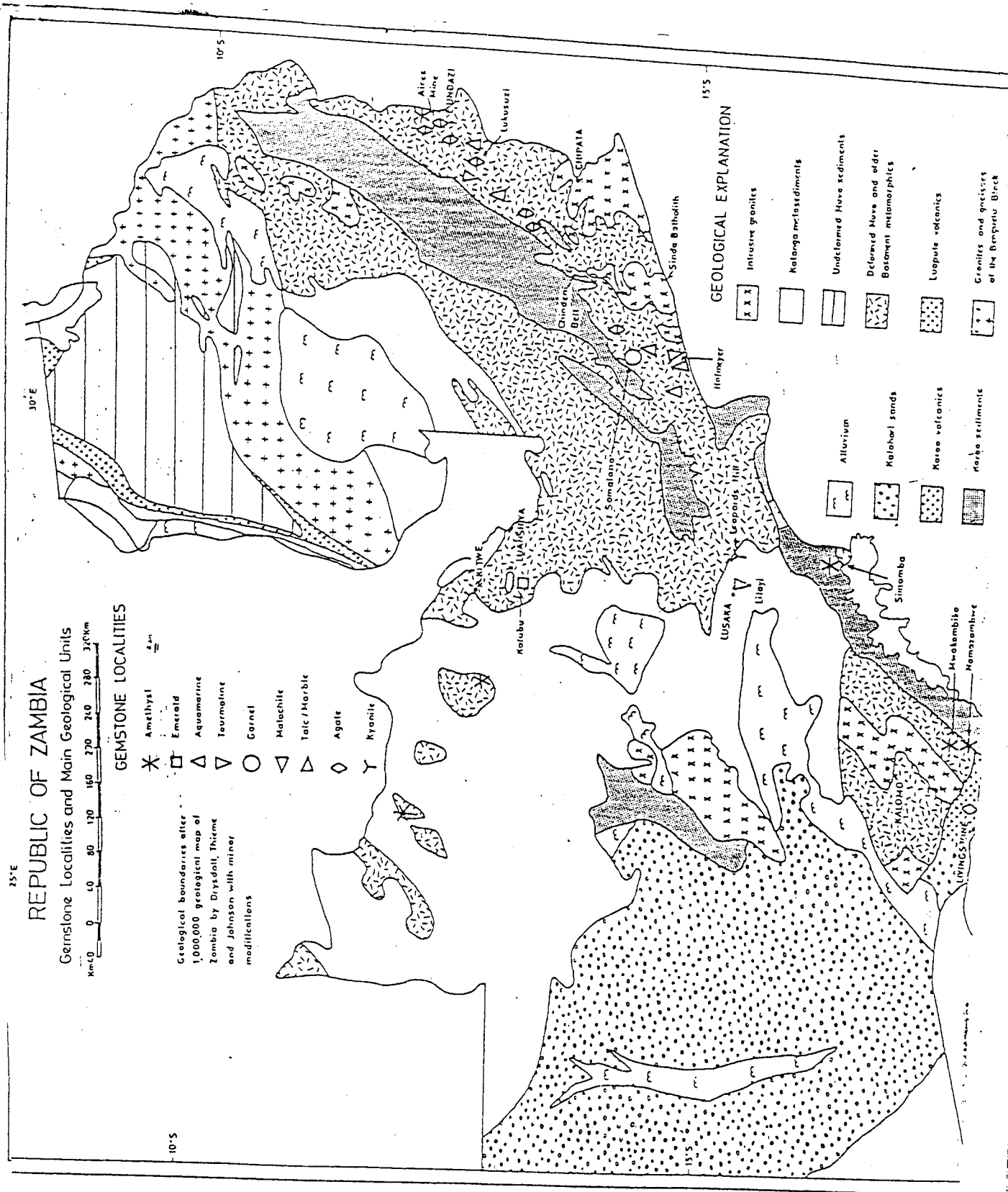
FIGURE 4-1 GEMSTONE LOCALITIES AND MAIN GEOLOGICAL UNITS OF ZAMBIA

(EDITED, AFTER TETHER ET AL. 1986)



GEMSTONE LOCALITIES AND MAIN GEOLOGICAL UNITS OF ZAMBIA

(UN-EDITED, AFTER TETHER ET AL. 1986)



granulitic gneisses of the pre-Katangan Basement Complex (38). The amethystine quartz veins occur in fracture zones. The zones are a few centimetres wide, but occasionally they may reach a metre or more. Individual crystals can be up to 12 Cm long. The colour varies from light pink to deep blue purple. A fairly constant supply of good quality amethyst has been exploited in this area.

Namazambwe amethyst area also lies just 6 Km south of Mwakambiko and is very close to the mid-Zambezi valley. Equally, it lies in granulitic Basement rocks(38). The amethyst here occurs sporadically within a north-east fracture zone and the veins are lenticular. The veins are much thicker than at Mwakambiko, they range up to 9 metres across, and can extend for hundreds of metres. Much of the vein material is colourless or milky white. The coloured material lack the depth and clarity of those found at Mwakambiko. Fracturing within the veins is very prevalent and as a result this location has not been a source of gem quality amethyst.

Another amethyst locality bordering the mid-Zambezi graben is at Simamba (Figure 4-1) near Kariba. In this locality, a vein fills a cavity of about one metre wide within silicified breccia. The Simamba amethyst is mid-purple in colour at its best and shows similar part-colouring and growth features to the Mwakambiko material. Simamba

amethyst deposit was mined for some years and later abandoned due to its quality.

Besides, amethyst has been reported in the Aries Mines near Lundazi, and near Mukumbi-Lubinga, west of Solwezi, none of them is at present commercially significant(38).

No statistics has yet been published in connection with all the above resources(46).

4.1.3 Production of Amethyst in Zambia

I. Mining

Mining of amethyst was commenced by Northern Minerals (Z) Limited, in the early 1950s at the Mwakambiko locality where a fairly constant supply of good quality amethyst has been mined. Precious Minerals (Z) Ltd, was the next Company to mine amethyst in this area. Production in this area was however interrupted during Zimbabwe's liberation war for independence in 1978.

Extensive amethyst mining is presently taking place in the Mwakambiko locality and the major mining companies include: Northern Minerals (Z) Ltd; Kankule Engineering

and Mining company; Intercontal Mining company Ltd; and Mindeco Small Mines Ltd. International DGC (Z) Ltd., took over from Precious Minerals in 1978, but the mining licence of the former was suspended in 1985. A total of 10 mining and prospecting licences was granted in 1986(39). Holders of licences are restricted to sell their products only through the state marketing agency.

Most of the mines are open pits and are on small or medium-scale. One of the shallow open cast workings at Mwakambiko has however developed into underground mining. The tools mostly used for mining include: hammers, shovels, hoes, pick axes and chisels. The medium-scale operators have bulldozers for overburden removal. The bulldozers are normally available for hiring by other miners. Generally, amethyst mining in Zambia is labour intensive.

Prior to 1978, some amethyst producers however used mechanized equipment. Most of their mechanized equipment were destroyed during Zimbabwe's liberation war in 1978.

The mined stones are sorted manually. Some of the mining companies have lapidaries where cobbing of the stones is done and more value added before marketing.

As previously specified the basic tools used for the production of amethyst in Zambia are very simple. As a result, the required investment and operating costs are relatively low compared to that of other traditional metal mining as earlier discussed(See III under 2.3.1, and I under 4.2.2)

II. Analysis of Amethyst Production in Zambia

Table 4-1 gives the production statistics of amethyst in Zambia for the period 1969-1987, and Figure 4-3 is a graphical representation of the production for 1969-1986. It could be seen from Table 4-1 and Figure 4-3 that production reached lowest levels in late 1970s during Zimbabwe's liberation war which resulted in the suspension of mining operations in Kalomo amethyst area. During this period Zambia's amethyst came from stockpile treatment operations.

Subsequently, Northern Minerals mining operation remained suspended after the war. This was as a result of protracted litigation between the shareholders over alleged marketing malpractices. The Zambian Government therefore ordered the continual closure of the mine until 1984. Figure 4-3 further shows that the general trend in Zambia's amethyst production has been very erratic over the period. Prior to the closure of the amethyst area in

TABLE 4-1: AMETHYST PRODUCTION 1969 - 1987
(Kg)

Mining Company	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Northern Mineral Company	94157	31408	87058	40720	22346	25095	34455	14956	29307	^a 9284	4860
Precious Minerals	7273	3909	6354	5405	56745	11499	2448	25878	SP	SP	SP
Mindeco Small Mines Limited	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
Kankule Engineering Mining Company	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
Intercontal Mining	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
Olman Enterprises and Mine Limited	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
TOTAL:	101430	35317	93412	46125	79091	36594	36903	40834	29307	9284	4860

SOURCE: Mines Development Department

TABLE 4-1: AMETHYST PRODUCTION 1969 - 1987 (CONTINUATION)

(Kg)

Mining Company	1980	1981	1982	1983	1984	1985	1986	1987
Northern Mineral Company	3298	827	^b NIL	NIL	NIL	1753	3854	2347*
Precious Mineral	NIL	^c 125000	69500	36375	22774	16797	NIL	NIL
Mindoco Small Mines Limited	NIL	NIL	NIL	1669	1784	362	1290	550*
Kankule Engineering Mining Company	NIL	NIL	NIL	755	268	700	1847	150*
Intercontal Mining	NIL	NIL	NIL	NIL	NIL	NIL	NIL	⁺ 375
Olman Enterprises and Mine Limited	NIL	NIL	NIL	NIL	NIL	NIL	NIL	^x 50
TOTAL:	3298	125827	69500	38799	24826	19612	6991	3472

SOURCE: Mines Development Department

a= Treatment from stockpile

b= Stockpile depleted

c= International DGC commenced mining in May 1980

SP= Stockpile

+= May to July

*= January to October

x= October only

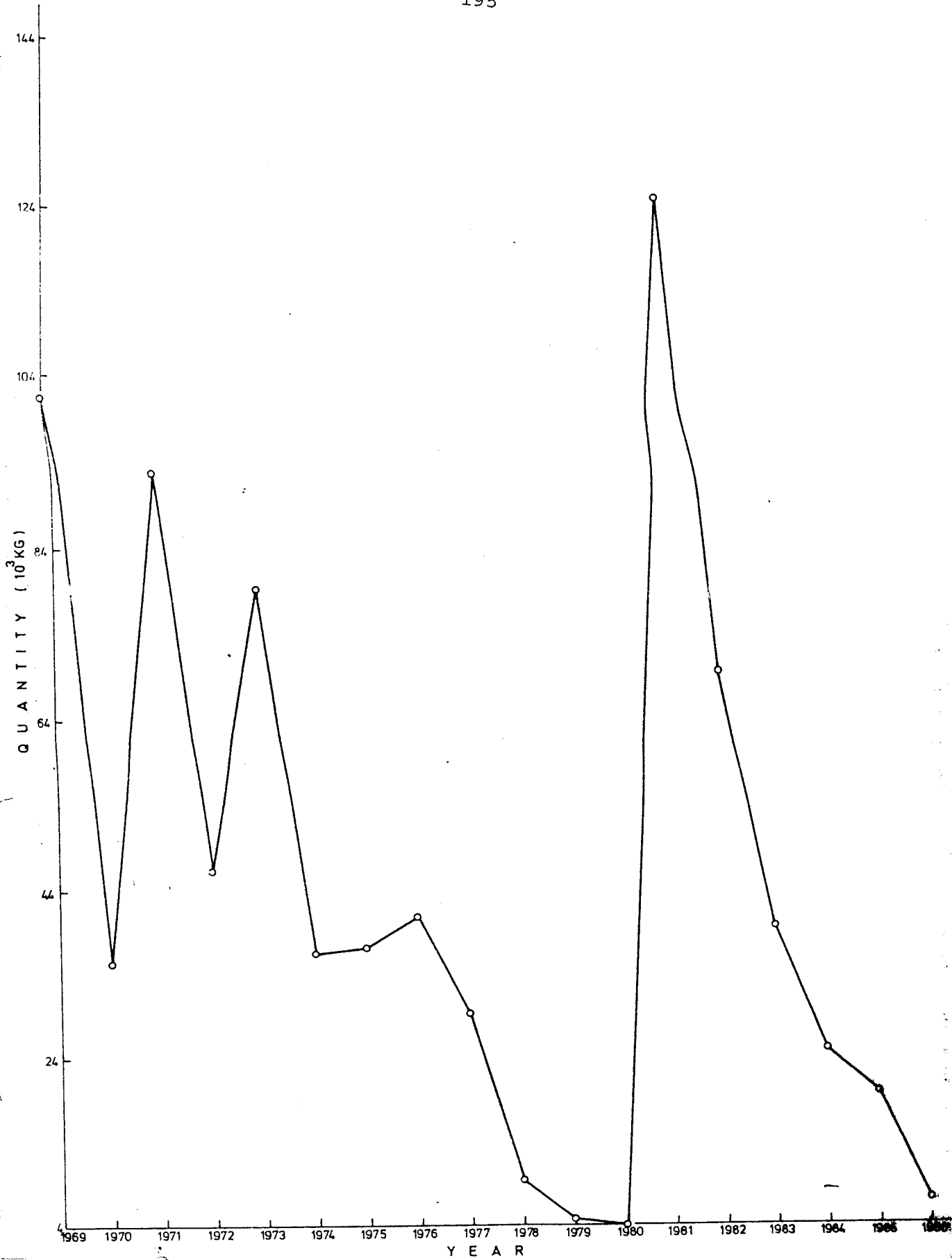


FIGURE 4-3 AMETHYST PRODUCTION IN ZAMBIA, 1969-1986

1978, international DGC (Z) Ltd.(IDGC) took over from Precious Mineral (Z) Ltd. IDGC commenced mining in 1980 and later in the year a big discrepancy was found between its monthly and annual production reports. Consequently, the Mining Development Department conducted an investigation and a revised figure by the holder exposed an annual production of 1313 tonnes instead of 125 tonnes previously reported(see Table 4-1). IDGC's misleading conduct persisted and finally, its mining licence was revoked in 1986. It could therefore be concluded that irrespective of the erratic character of gemstone deposits, the erratic trend of amethyst production in Zambia is partly due to such malpractices by some producers.

However, production reached record levels in 1981 due to the huge stockpile left by Precious Minerals (Z) Ltd., which was readily available for treatment by IDGC when the later commenced mining in 1980.

From Table 4-2, though Northern Minerals re-opened its mine in 1984, it has not been able to reach its production records of the 1970s due to the following reasons. First, the near surface veins in the Kalomo Amethyst area are depleted and the deposits could well be mined by underground mining methods. Second, Northern Minerals production since 1984 has been labour intensive due to

the loss of most of its mechanized equipment during the Zimbabwe's liberation war. The grade of amethyst is also declining with depth. Besides, when IDGC's mining licence was suspended and subsequently revoked, the claim was given to the Reserved Mineral Corporation (RMC). RMC has not commenced the mining of this deposit. Therefore, Northern Minerals situation since 1984, combined with RMC's new amethyst claim which remains unexploited, explains to a large extent the downward trend of Zambia's amethyst production since 1984.

III. Analysis of the Past Marketing Arrangement for Amethyst in Zambia

Throughout 1950s and up to the late 1970s amethyst producers in Zambia made their own marketing arrangements. Marketing of amethyst over the period was therefore done by dealers. For instance, the marketing of Northern Mineral's amethyst was done by a Liechtenstein firm who charged a sales commission of 10 per cent of the invoiced price (net of certain expenses). However, there were malpractices(collusion) in these producer marketing arrangements. As a result, in 1979 a ministerial directive was declared and Memaco became the sole sales agent for amethyst producers in Zambia. Later in 1980, Reserved Mineral Corporation (RMC) was given the sole right to mine and market emeralds in Zambia. Further

developments forced the Zambian Government to appoint RMC as the sole Government marketing institution for all gemstones in Zambia.

Tables 4-2, 4-3 and 4-4 show the quantities and respective prices of amethyst sold by the three companies who mined amethyst in Zambia over the period 1969-1981. Figure 4-4 also illustrates the trend in the unit prices of their sales over the same period. International D.G.C (Z) Ltd. (IDGC) sales cover 1980 - 1981 on the graph. All prices are Free On Board (F.O.B), Lusaka. Stones were exported as run of mine amethyst. It can be seen from Figure 4-4 that apart from the two occasions in 1980 when IDGC sold knocked amethyst(i.e sold after cobbing) and obtained peak prices, all IDGC's prices over the 1980-81 period were far below that obtained by the other companies a decade ago. For instance, as far back as 1976, Northern Minerals obtained a price of K43.60 per kg, on the contrary, IDGC in 1980 was selling similar material for as low as K1.00 per Kg. Besides, IDGC's production cost according to the Company's annual report in 1980 was K4.55 per Kg. Table 4-4 further shows that IDGC's sale prices of run of mine amethyst varied considerably with the identity and the country of origin of the buyer. For instance, it is very clear from Table 4-4 that buyers from West Germany obtained their stones at relatively cheaper prices. Table 4-4 also shows that Arthur Pick, a Director

TABLE 4-2 NORTHERN MINERALS (Z) LTD. SALES OF
AMETHYST 1969 - 1981

Year	Quantity(Kg)	Sales Returns (K)	Price Per Kg (K)
1969	94,012	258,992	2.75
1970	30,456	391,185	12.84
1971	87,063	252,667	2.90
1972	40,720	1,029,849	25.29
1973	22,345	617,390	27.63
1973	25,095	489,109	19.49
1974	29,455	715,893	24.30
1976	14,956	652,216	43.60
1977	29,307	903,034	30.81
1978	9,284	338,163	36.42
1979	4,860	113,732	23.40
1980	3,298	66,554	20.18
1981	827	6,016	7.27

SOURCE: Mine Development Department, Annual Reports 1969-1981

TABLE 4-3 PRECIOUS MINERAL CO. (Z) LTD. SALES
OF AMETHYST, 1969 - 1976

Year	Quantity (Kg)	Sales Returns (K)	Price Per Kg (K)
1969	7,308	160,770	22.00
1970	3,900	85,790	22.00
1971	6,354	127,122	20.00
1972	5,405	77,183	14.27
1973	56,745	100,587	1.77
1974	11,499	30,767	2.68
1975	2,448	14,239	5.82
1976	25,878	658,679	25.45

SOURCE: Mine Development Department.
Annual Reports, 1969-1976

TABLE 4-4: INTERNATIONAL D.G.C. CO. (Z) LTD. SALES OF AMETHYST 1980 - 1981

DATE	QUANTITY. (KG)	SALES RETURNS (K)	PRICE PER KG (K)	CUSTOMER
29-2-1980	19,260	158,278.00	8.22	Not Known
18-6-1980	15,850	69,259.30	4.37	West Germany
28-7-1980	31	3,254.97	105.00 ^a	West Germany
19-8-1980	7,000	50,420.63	7.20	Japan
7-9-1980	4,960	5,301.59	1.07	Arthur Pick
14-10-1980	10	984.43	98.40 ^a	United Kingdom
22-10-1980	2,000	14,929.60	7.46	West Germany
30-10-1980	18,000	86,995.05	4.83	West Germany
28-11-1980	5,000	39,904.91	7.98	South Africa
24-3-1981	10,000	57,995.70	5.80	Hong Kong
TOTAL:	82,111	487,324.18	5.93	

SOURCE: Mines Development Department, Annual Reports, 1980 - 1981

^a = Knocked Amethyst

TABLE 4-4: INTERNATIONAL D.G.C. CO. (Z) LTD. SALES OF AMETHYST 1980 - 1981 (CONTINUATION)

DATE	QUANTITY (KG)	SALES RETURNS (K)	PRICE PER KG (K)	CUSTOMER
1-7-1981	4,000	22,279.26	5.56	Hong Kong
7-8-1981	10,000	42,963.02	4.30	West Germany
17-9-1981	20,000	35,607.41	1.78	Gencraft
30-9-1981	2,000	12,282.86	6.14	Arthur Pick & Co.
9-10-1981	4,000	24,556.96	6.14	Hong Kong
13-11-1981	1,000	1,351.13	1.35	South Africa
5-11-1981	3,000	29,056.56	9.69	Japan
17-12-1981	12,000	64,212.82	5.35	West Germany
TOTAL:	56,000	232,310.02	4.14	

^a = Knocked Amethyst

SOURCE: Mines Development Department, Annual Reports, 1980 - 1981

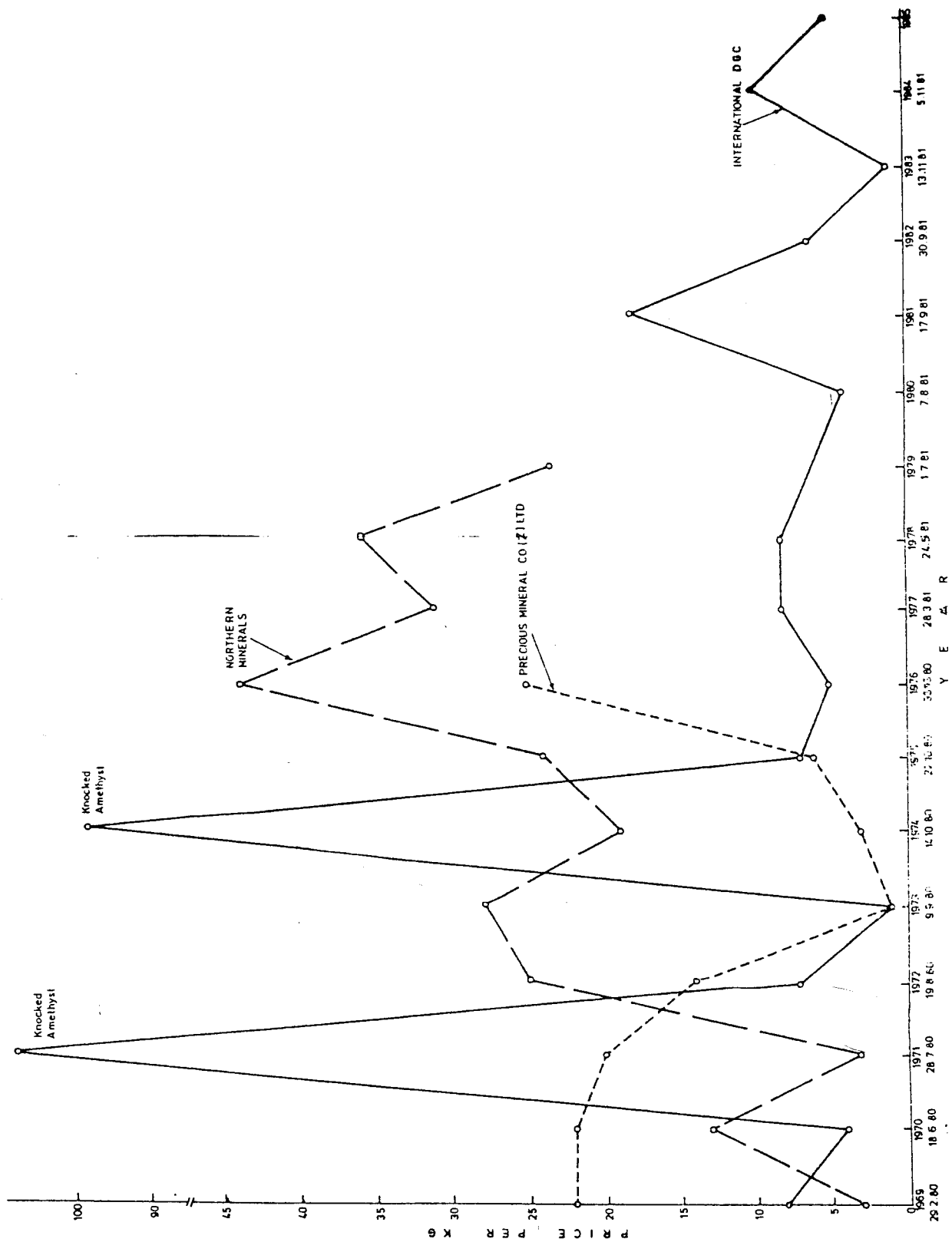


FIGURE 4-4 UNIT PRICES OF ZAMBIAN AMETHYST SALES,

1969 - 1981

and major shareholder of IDGC sold about 5000 Kg of amethyst to himself at a lowest prices of K1.00 per Kg in 1980. Hutchinson(40), giving his view on IDGC's operation commented:

This is a classic example of how to defraud a developing country of its assets by selling to yourself when exporting.

In addition, the Mines Development Department reports that new customers had extreme difficulties in obtaining amethyst from IDGC. The Company (IDGC) was therefore embarking on transfer pricing.

As previously indicated IDGC took over Precious Minerals' mining claim in 1978. This was because the majority shareholders of the latter got involved in exchange control fraud in Zambia. In addition to IDGC's false production reports, in 1981, an investigation revealed that a total sales of more than 82 tonnes of amethyst was made by IDGC instead of 65 tonnes reported by the company. IDGC malpractices persisted over the years of its operation. In 1983, Metal Marketing Corporation of Zambia Limited (MEMACO) sought permission to export 5450 Kg amethyst to West Germany on behalf of IDGC with price of K7.20 per Kg. On the contrary, IDGC has reported only 923 Kg. at a quoted price of K9.00-K150.00 per Kg over the

same period. Hutchinson (40) summarising IDGC's operation observed that,

It has been normal practice of this company [IDGC and Precious Minerals] over the last 10 years to export amethyst well below the world market price to its own subsidiary or associated company...according to mining programme the company is required to process before it is exported which is a condition of licence.

IDGC was hiding under selling run of mine and depriving Zambia of her revenue. Hutchinson further reports that when the Ministry of Mines became involved in the marketing arrangements for IDGC, as high as K180 per Kg offer was made(40). Furthermore, during MEMACO's sales on behalf of IDGC, the latter on certain occasions substituted better and more valuable material for some contractual consignment. In other instances however, certain customers finally received imported amethyst inferior in quality than they have contracted for(41).

MEMACO's sales of amethyst on behalf of Mindeco Small Mines were also not without problems. For instance, according to MEMACO, on about six occasions, Mindeco Small Mines sold amethyst without the consent of the former(41).

From the above discussions, it could be seen that the marketing arrangements for amethyst in Zambia has been very inappropriate and was opened to wide abuse over the years under review. This suggests the need for proper marketing policy for the gemstone industry in Zambia and developing countries in general, since such loss of revenue militates against their economic development.

Langevad, Zambia Mine Commissioner(42) in his comment on the Zambian amethyst marketing arrangements confirms that "the most important part of the gemstone business is the marketing, the stones are sold through agents but the price they pay to the producer in Zambia bears no obvious relationships to the retail price".

He further reports(42):

This has been explained by the very complex structure of the gemstone industry which is built almost entirely on monopolistic lines. An Agency gets control of the particular type of stone and by popularising it with dealers and the public builds up an artificial price which is then held by restricting supplies and the circle of distribution. To maintain this position, the relationship between the agents and dealer is very complicated and it is interesting to note that the highest figure in 'expense' is Agents

Commission, (about 13 per cent of turnover).

According to Langevad(42), a study by the Zambia Ministry of Mines on gemstones marketing revealed that the ramifications of the industry were so involved on an international basis that it was quite impossible to follow any particular line through producer to the end product. Cassidy, the Chief Mining Engineer(43) commenting on Northern Minerals Annual Report confirms:

The mining operation is a simple one and does not involve substantial capital expenditure. The real expertise is in the marketing of the product.

Furthermore, the Chief Mining Engineers' letter to MEMACO(44) inquiring of the possibility of the latter taking over amethyst marketing in Zambia emphasized that,

Contracts for marketing of amethyst [at that time] are made directly between the producing company and the agent, and while the bonafide nature of any agreement may not be in doubt it is difficult for Government to satisfactorily check any agreement made.

Finally, in the previous analysis of the sales performance of IDGC, much reference was made to the supposed good performance of Northern Minerals' amethyst sales. Taking cognisance of the protracted litigation which took place between Northern Minerals shareholders in the early 1980s over alleged marketing malpractices, combined with MEMACO's report of Mindeco Small Mines secretive amethyst sales as well as IDGC's pricing and marketing malpractices, Zambia's past amethyst pricing and marketing becomes very bleak.

4.2 Emerald

4.2.1 Resources

The emerald deposits of Zambia are located southwest of the Copperbelt (Figure 4-1). The emeralds occur in the valley of the Kafubu River, a tributary of Kafue river, west of Luanshya. The first comprehensive evaluation and report of emerald occurrence in Zambia was in 1972 though earlier study was undertaken by Baker (45) in the Miku area. Baker concluded that there was no deposit of economic significance. Commercial mining of emeralds in Zambia however, began in 1974.

The Kafubu emerald deposit occur in Muva rocks. These Muva rocks consist mainly of schist and semi-pelite, lenses of

talc and magnetite are also present(45). The Muva rocks have been intruded by a series of tourmaline rich veins and pegmatites. The emeralds are found in the contact of the pegmatites veins with the schists and within the quartz - tourmaline veins(45). According to Nguluwe et al. (45), Zambia emerald fields are comparable both in quality and quantity to the Colombian emerald fields, though their lithological setting differs considerably. They further report striking similarities between Zambian emerald occurrences and those of South Africa and Zimbabwe (45).

The area of established emeralds mineralisation is now confined to a rectangle of about 170 square Km within which 10 prospects have been identified. Those 10 prospects in the Kafubu area are located within 3 distinct E-W Zones (Figure 4-5). Their distribution in the Zones are as follows; Miku, Dabwisa and Fibolele prospects occur in the Northern Zones; the Kamakanga, Pirala, Fwaya-Fwaya and Libwente deposits in the Central Zones; and Nkabashila and Mitondo in the Southern Zone (Figure 4-5).

New emerald discoveries after 1974 led to prospecting and initial surface mining by private as well as parastatal companies. In 1977 Mindex (Mindeco group) undertook more detailed exploration over the whole Kafubu area. However, illegal mining within the area became so extensive that

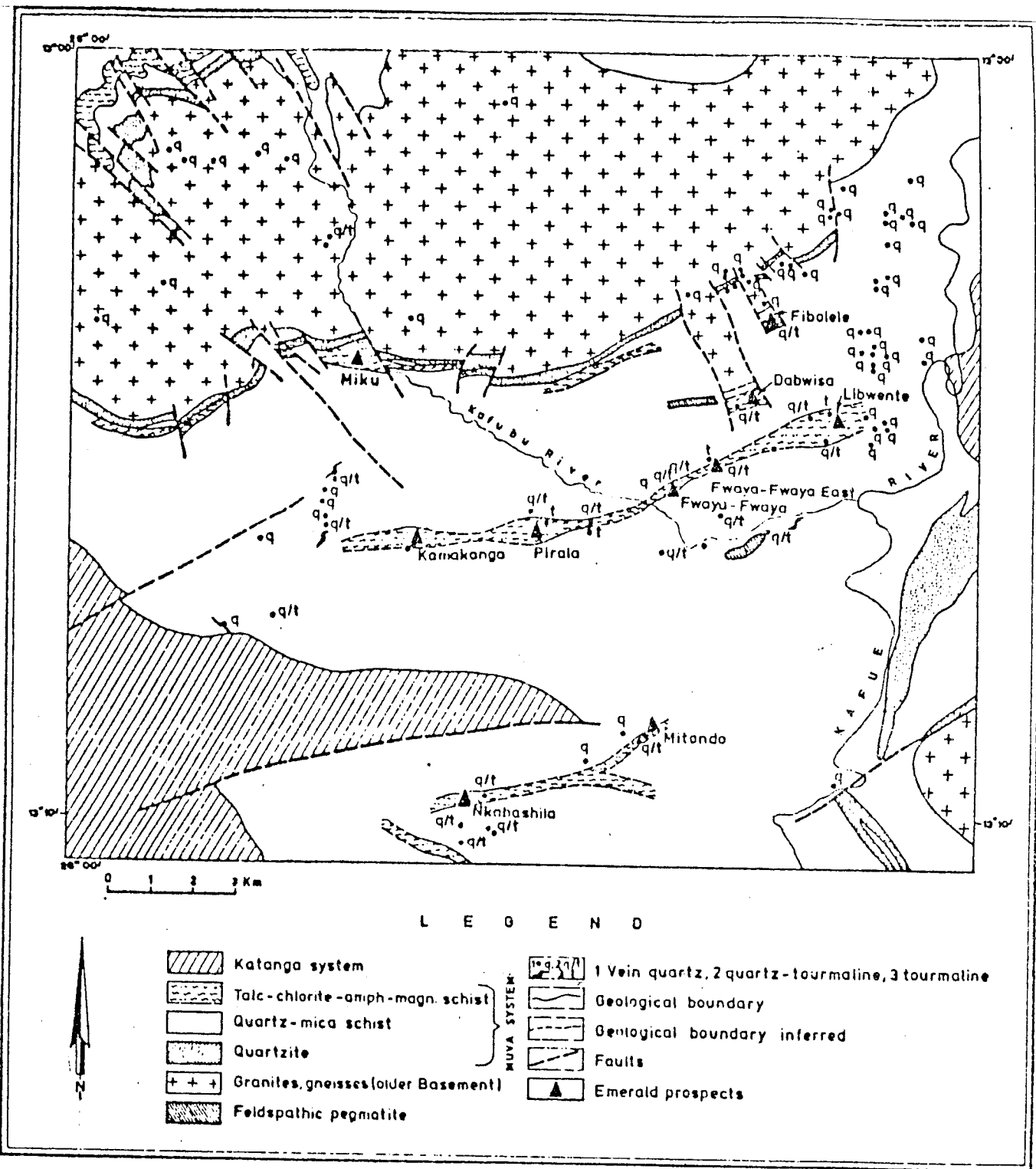


FIGURE 4-5 GEOLOGICAL MAP OF THE KAFUBU AREA
(MODIFIED AFTER HICKMAN, 1972)

the whole area was closed to prospecting and mining at the end of 1978. In 1980 a new Government controlled agency, the Reserved Mineral Corporation, (RMC), was given the legal right to conduct exploration, mining and marketing of emeralds in Zambia. RMC failed to perform these functions because of lack of funds and expertise. As a result, the Government later allowed other Zambian companies and co-operatives to participate in the exploitation of emeralds in Zambia. RMC was also charged with the responsibility of entering into joint venture arrangements with foreign and local investors in emeralds mining. RMC retained its function as the sole Government marketing Institution for emerald, and the right to market other gemstones in Zambia was also vested in RMC. No statistics have yet been published in connection with emerald resources in Zambia(46).

4.2.2 Production of Emerald in Zambia

I. Mining

Majority of emerald production in Zambia has been won from the Kamakanga, Fwaya-Fwaya, Pirala, Libwente, Dabwisa and Nkabishila prospects (Figure 4-5). In 1986, a total of 113 emerald Mining and Prospecting licences were granted by the Mines Development Department(39). The major emerald mining companies in Zambia presently include:

Kagem Mining Limited, Nkularu (R & N) Mining and Gem Prospecting Company Limited, Lumpuma Mine Limited, Norodom Mine Limited, Pirala Mining Company Society, Twampane Mining Co-operative Society, Kafubu Mineral Co-operative Society, Gertina Mines Limited, Hiwa Mine Limited, and Asbestos Enterprise Limited.

Mining of emeralds in Zambia is mostly on small-scale except Kagem Mining Ltd., and some few other mining companies. The small-scale operations are open cast and are highly labour intensive, labour is much exploited and most of the mining environments are unsafe. In addition, safety working kits are not provided for the miners in most cases. The main tools used by small-scale operators are shovels, pick axes, hammers, chisels, wheel barrows and steel ladders. Some small-scale miners employ winches and water pumps. In most of the small-scale operations, the pits are unplanned and near vertical benches are not uncommon, though the geotechnical conditions in the area do not require such bench slopes for safe mining operations. The small-scale operators in most cases are so preoccupied with following the emerald pockets. As a result, little or no attention is given to the development of their pits, though such development work will give a better access to the veins and therefore help increase their extraction ratios.

Nevertheless, some small-scale operators are performing creditably well. Though, they do not have the necessary equipment for development purposes, they usually make every effort to hire these equipment for drilling and blasting, overburden removal et cetera. The visit to some of the small-scale mines revealed that some of the operators who are performing well had formerly been exposed to mining in some of the traditional metal mines in Zambia. Most of the small and medium-scale operators emphasized the invaluable assistance they received from former illegal miners in the area, especially in the identification of the emerald veins during the prospecting stages.

The small-scale operators after locating the emerald pockets, cautiously collect the emeralds which are later washed and sorted for subsequent marketing.

Few of the emerald mining companies in Zambia are mechanized. They employ excavators, front-end loaders, and other modern earthmoving machinery for their production. They therefore take advantage of economies of scales. For instance, Kagem Mining Company is reported to be one of the biggest coloured stone mining companies in the world(46). Depending on the geotechnical conditions on a particular pit, emeralds are mined with or without drilling and blasting. Excavators and loaders are used

for the latter. In the former case, after drilling and blasting, simple hand tools (e.g. chisels and hammers) are further used in collecting the emeralds from the veins. This operation of gemstone collection requires much experience and caution. The mined material is subsequently washed, chipped, sorted and graded. Some of the materials transported to the washing plant requires primary and secondary crushing before screening and sorting could be done.

One outstanding feature of gem mining in some of the emerald mines in Zambia is the complex security structure. For instance, for Kagem Mine, there is one security man per 2 mine workers, and in addition, 3 extra security men for the chiselmens. For sorting and grading Kagem has one security man for every sorting man. In all, Kagem has 5 security check points.

Investment and operating costs in the emerald industry in Zambia vary considerably, however, they are relatively low compared to that of traditional metal mining in Zambia. For instance, Kafubu Mineral Co-operative Society's initial investment in basic tools in early 1985 was 1755 US dollars(ZK4,300), and the bulk of investment which enabled Kagem. Mining Limited to operate on a large scale in 1984 was in the range of 5 million US dollars. In addition, lead time in emerald industry in Zambia like

most gemstones operations is relatively short. For example, at the end of one year operation, Kafubu Mineral Co-operative society had produced 600 gm good quality emerald worth about 10,000 US dollars, and Kagem Mining Limited also reported an after tax profit of 3.2 million US dollars (ZK28 million) in 1986/87 financial year, 3 years after its previous specified bulk investment of 5 million US dollars (47).

The large-scale gemstone mining companies in Zambia have easy access to credit facilities from financial institutions in Zambia and elsewhere. Small-scale operators on the other hand, mostly rely on private financiers. Some of these financiers demand payment in kind. The refusal of financial institution to extend credit facilities to small-scale operators in Zambia is mainly due to the high risk involved in their operations.

II. Analysis of Emerald Production in Zambia

Table 4-5 shows the officially reported emerald production in Zambia from 1971-1987. In addition, Figure 4-6 shows the production trend over 1983-1987 period. According to Table 4-5 in 1972 and 1974 Mindeco Small Mines produced all the Zambian emeralds, and Nkuralu (R & N) Gem Prospecting Company equally produced all the emeralds in 1977 and 1978 after which the Kafubu area was closed due

TABLE 4-5: EMERALD PRODUCTION (KG) 1971 - 1987

Mining Company	1971	1972	1973	1974	1975	1976	1977	1978	1978	1979	1980
Kagem Mining Co.	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Nkuralu Gem (R & N) Prospecting Co.	Nil	Nil	Nil	Nil	Nil	Nil	109	490	Nil	Nil	Nil
Lumpuma Mine Ltd.	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Pirala Mining Co-operative Co-operative Society	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Twampane Mining Co-operative Society	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Kafubu Mineral Co-operative Society	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Norodum Mine Ltd. Bumwa Mine	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Hijwa Mine Ltd.	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Asbestos Enterprises Ltd.	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Rural Mines Gertina Mines Ltd.	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Mindeco Small Mines	Nil	14.79	Nil	10.84	Nil	Nil	Nil	Nil	Nil	Nil	Nil

TABLE 4-5: EMERALD PRODUCTION (KG) 1971 - 1987
(CONTINUATION)

Mining Company	1981	1982	1983	1984	1985	1986	1987
Kagem Mining Co.	Nil	Nil	Nil	Nil	89.78	392.29	690.33*
Nkuralu Gem Prospecting (R & N) Co.	Nil	Nil	13.5	19.1	24.1	5.4	26.4*
Lumpuma Mine Ltd.	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Pirala Mining Co-operative Society	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Twampane Mining Co-operative Society	Nil	Nil	Nil	Nil	Nil	10.51	6.40 ^c
Kafubu Mineral Co-operative Society	Nil	Nil	Nil	Nil	Nil	0.600	1.6
Norodum Mine Ltd. Bumwa Mine	Nil	Nil	Nil	Nil	Nil	4.60	Nil
Hiwa Mine Ltd.	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Asbestos Enterprises Ltd.	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Rural Mines Gertina Mines Ltd.	Nil	Nil	Nil	Nil	Nil	Nil	5.50
Mindeco Small Mines	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Reserved Minerals Corporation Ltd.	Nil	Nil	3.98	1.92	Nil	Nil	Nil
TOTAL: 1981 - 1987			17.48	21.02	113.88	413.4	730.23

SOURCE: Mines Development Department

+ = only October to December

* = January to September

c = January to April

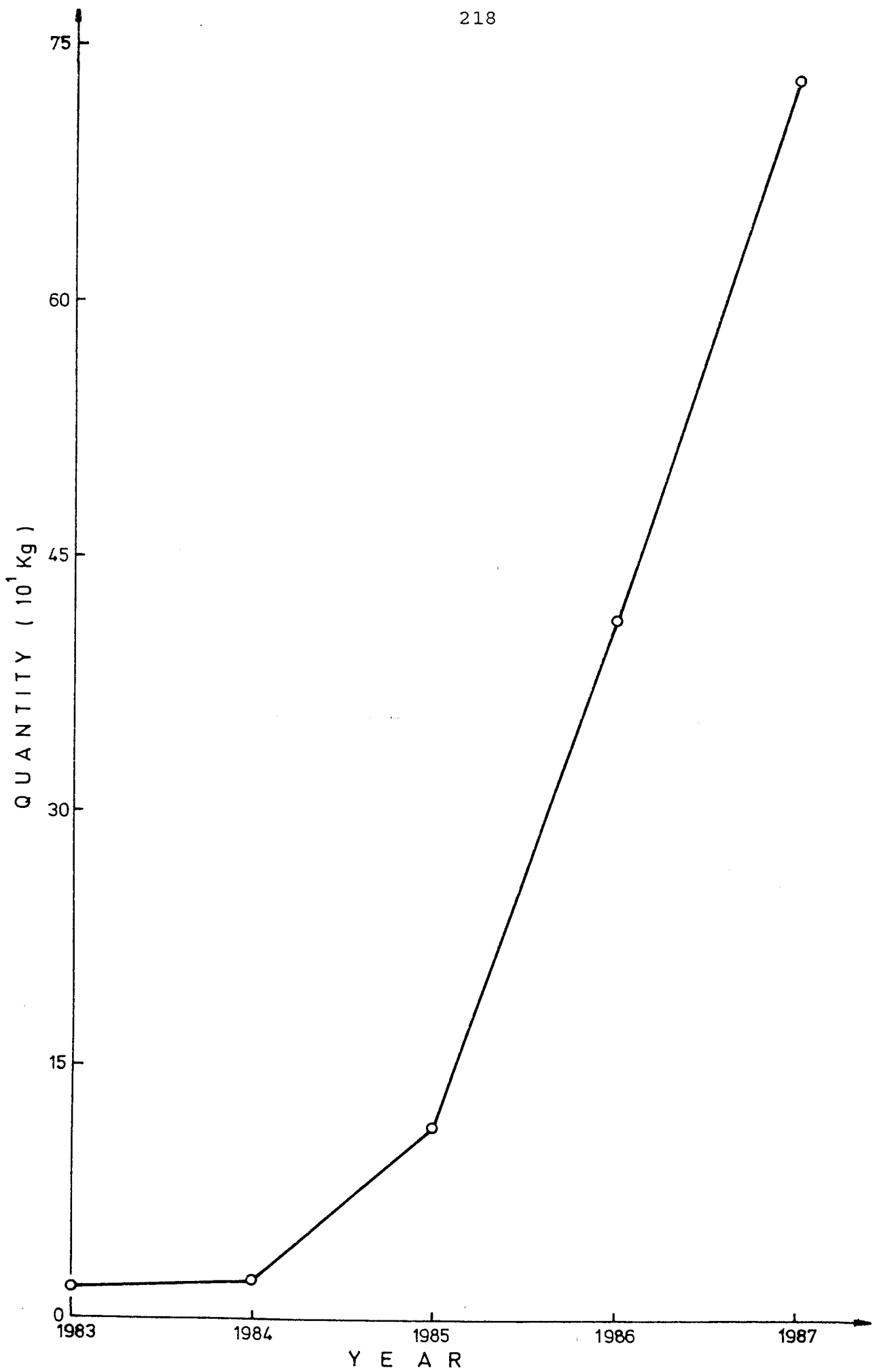


FIGURE 4 - 6 EMERALD PRODUCTION IN ZAMBIA, 1983-1987

to extensive illegal mining. In 1983 there were only two emerald mining companies and Nkuralu (R & N) Company produced 77 per cent of the total production and the remaining 23 per cent emeralds was produced by Reserved Mineral Company (RMC). Nkuralu (R & N) company's production increased by 41 per cent from 1983 to 1984 and there was a further 26 per cent increase in its production in 1985. Nkuralu's production declined drastically in 1986 probably due to operational problems and internal conflicts between major shareholders among other reasons. However, in 1987 its production increased more than 100 per cent compared to 1986.

In 1984 a joint venture company, Kagem Mining Limited was formed by RMC (holding a 55 per cent shares) and a foreign company Hagura Limited (holding 45 per cent shares). Consequently, the major underlying financial and expertise problems facing RMC were resolved and since then Kagem has been operating commendably. Table 4-5 shows that in 1985, Kagem Mining Ltd., produced 79 per cent of Zambia's emeralds. It also supplied 95 per cent each of Zambia's emerald production in 1986 and 1987 respectively. In short, Kagem Mining Limited is presently the major producer of emeralds in Zambia. As shown in Figure 4-6, there has been a large positive trend in emerald production in Zambia since 1983. This trend is mainly a reflection of the considerable increase in Kagem's

production. The emerald industry in Zambia is therefore, very concentrated, with a concentration ratio of 0.95 and Herfindahl-Hirschman(HH) index of 0.89, for only one principal unit (Kagem).

Individual small-scale mines and co-operatives entered the Zambian emerald industry mostly in 1986. According to Table 4-6, in 1986, 4 per cent of the total emerald production was from small-scale and co-operative mines. Their production declined to only 2 per cent in 1987 (see Table 4-6). The substantial fall in the share of medium, small-scale and co-operatives over this period may be due to:

- (a) Smuggling, which can serve as a confirmation to the Ministry of Mines allegation in the press (49); "that all the mines declare, in terms of quantities as required by the Mines and Mineral Act, does not fully represent what they produce."
- (b) the lack of necessary assistance specifically to the small-scale operators in their attempt to exploit emeralds in Zambia, a problem which was identified during the visit to the small-scale mines. This is particularly woeful due to the fact that investment requirements for these small-scale operators are relatively low as previously discussed.

TABLE 4-6: ESTIMATED SHARE OF SMALL-SCALE MINING
SECTOR IN THE PRODUCTION OF EMERALDS
IN ZAMBIA, 1986 - 1987
(PER CENT)

ORIGIN	1986	1987
Share from:		
Small Scale Mines	4	2
medium and Large Scale Mines	96	98
TOTAL	100	100

SOURCE: Calculated from Table 4-5

4.2.3 Marketing of Emeralds in Zambia

The Reserved Minerals corporation (RMC) was established in 1980, and since then has maintained its role as the sole Government marketing institution for the marketing of emeralds in Zambia. Prior to this arrangement, Metal Marketing Corporation of Zambia Limited (MEMACO) performed this function on behalf of the emerald producers in Zambia.

I. Mode of Marketing of Emeralds in Zambia

Zambia's emeralds are marketed in the rough form and on close bid auction basis. The venue for auction is sometimes in Zambia or abroad (mostly in Geneva). Invitations are sent to selected buyers by RMC announcing the period of auctions. Buyers who accept to participate in the auction are made to sign a contract of participation, binding them to some rules (details not available for confidential reasons). The emeralds are split into parcels and each invited buyer has a chance of buying at least one parcel on agreed price. Splitting parcels further during the action is not allowed.

During the auctions buyers are allowed to inspect the parcels and make close bids. The bidding operations normally starts on Mondays and ends on Fridays. On the last day (Friday), tenders are opened. RMC and representatives from both the Ministry of Mines and small-scale mines participate in the opening of the tenders to avoid any act of collusion. RMC has its own reserve prices which are set by a valuer from Switzerland before each auction takes place. The valuer is employed on contract basis and in most cases gets 5 per cent commission which is deducted from RMS's commission. On the basis of RMC's reserve prices which normally serve as a minimum base price, successful tenders are selected.

The successful tenders are notified, and subsequent payment and collection of respective parcels are effected. Payment is done in convertible foreign currency. Major buyers of Zambia's emeralds are from Hong Kong, Israel and India.

Minority shareholders of Kagem however buy their emeralds from Kagem's output, and at RMC's reserve prices. They can also participate in the auctions. Kagem minority shareholders buy about 49 per cent of Kagem's production for their lapidaries. RMC, as the marketing agent receives 10 per cent commission from all emerald producers in Zambia.

II. Analysis of Past Emerald Auctions in Zambia

Table 4-7 shows quantities and respective revenues of Zambia's emeralds sold over the period 1984-1987 by RMC and the source of their supply. Table 4-8 further shows the percentage share of the sales by weight and value in 1984-1987, and Figure 4-7 represents the trend in quantities sold over the same period. It can be seen from Figure 4-7 that there is a positive trend in quantities of Zambia's emeralds sold over the period. In addition, Tables 4-7 and 4-8 show that since 1985, between 61 per cent to 98 per cent of emerald sold by RMC came from the

TABLE 4-7: SALES OF ZAMBIA EMERALDS AND THE STRUCTURE OF SHARES BY WEIGHT AND VALUE 1984 - 1987

YEAR	LARGE-SCALE MINE(KAGEM)		MEDIUM-SCALE MINES		SMALL-SCALE MINES		TOTAL	
	Quantity (KG)	Sales Returns (US Dollars)	Quantity (KG)	Sales Returns (US Dollars)	Quantity (KG)	Sales Returns (US Dollars)	Quantity (KG)	Sales Return (US Dollars)
1984	-	-	15.935	569,328.00	1.838	16,326	17.773	585,654.00
1985	44.840	1247520.00	29.227	470,110.00	-	-	74.067	1,717,620.00
1986	250.575	2346115.00	10.400	324,000.00	18.153	236,502	279.128	2,906,617.00
1987	1737.5	16139676.00	24.30	1,079,800.00	19.00	357,567	1780.8	17,577,043.00

SOURCE: Mines Development Department

TABLE 4-8: STRUCTURE OF ZAMBIA EMERALD SALES BY WEIGHT AND VALUE,
1984 - 1987

YEAR	(PER CENT)							
	LARGE-SCALE MINES (KAGEM)		MEDIUM-SCALE MINES		SMALL-SCALE MINES		TOTAL	
	BY WEIGHT	BY VALUE	BY WEIGHT	BY VALUE	BY WEIGHT	BY VALUE	BY WEIGHT	BY VALUE
1984	-	-	89.66	97.21	10.34	2.79	100.00	100.00
1985	60.54	72.63	39.46	27.37	-	-	100.00	100.00
1986	89.77	80.71	3.73	11.15	6.50	8.14	100.00	100.00
1987	97.57	91.83	1.36	6.14	1.06	2.03	100.00	100.00

SOURCE: Calculated, from Table 4-7

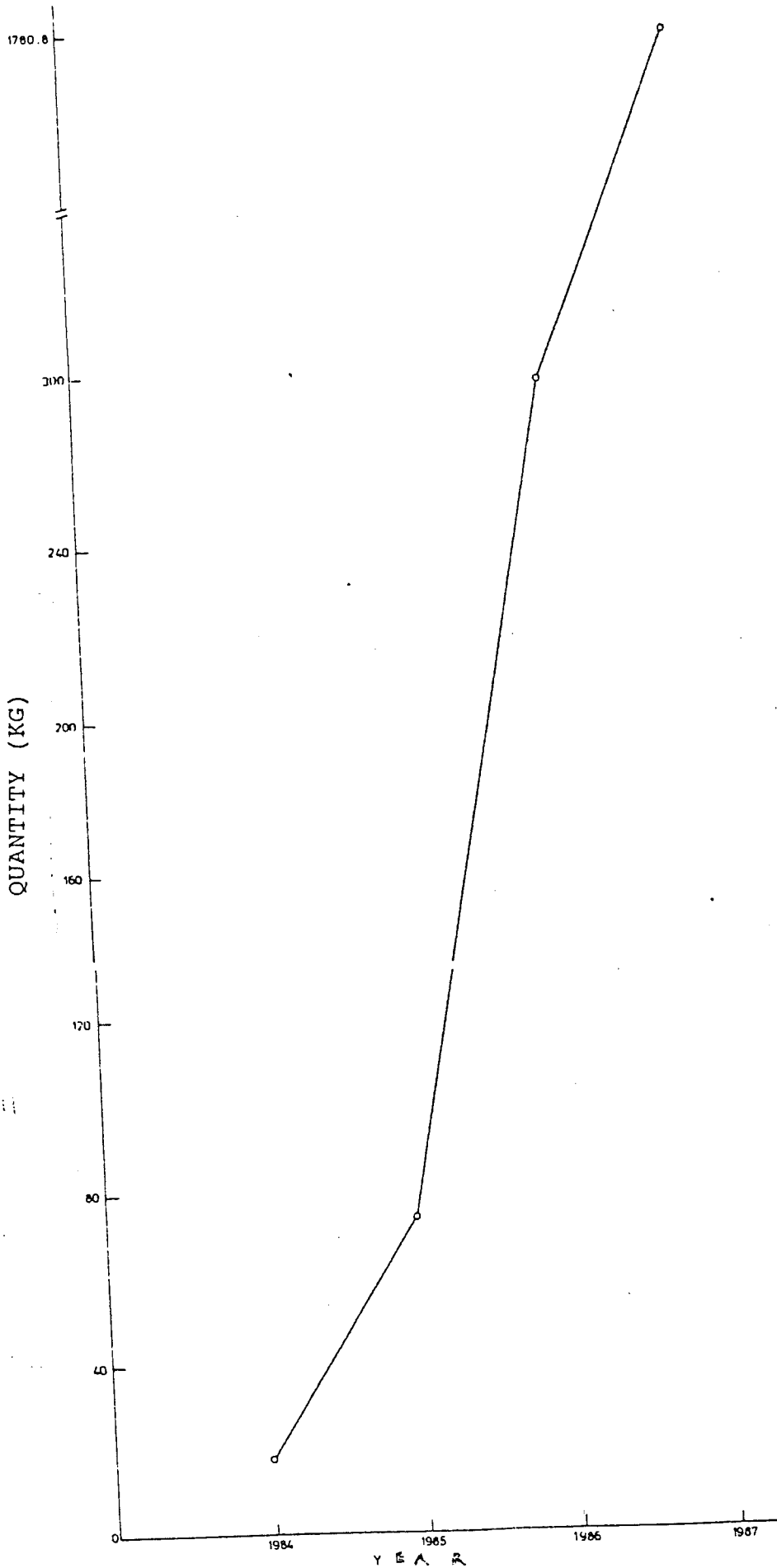


FIGURE 4-7 QUANTITY OF ZAMBIAN EMERALD SOLD, 1984-1987

large-scale mine (Kagem).

Table 4-8 also shows that in 1984 more than 89 per cent of sales was from the medium-scale mines. Quantities sold by the medium-scale mines have decreased considerably over the period. As at 1987, only about 1 per cent of RMC sales was from this group. This situation is strange since they have most of the required machinery as well as reserves at their disposal. They have however attributed their present situation to operational problems and internal conflicts between shareholders. In 1984 the small-scale miners supplied more than 10 per cent of RMC total sales. Their sales have also declined considerably and they supplied only 1 per cent of RMC sales in 1987. As previously discussed this may be due to smuggling and lack of necessary government assistance.

Furthermore, from Table 4-8, Kagem's share of sales by value was between 73 per cent and 92 per cent over the period. Medium-scale mines share by value was 97 per cent in 1984. The share of medium-scale operators by value has also declined substantially over the period though to a lesser extent compared to their share by weight. Table 4-8 further shows that small-scale operators share by value was between 2 per cent and 8 per cent.

Table 4-9 shows the unit prices of RMC sales over the

TABLE 4-9 UNIT PRICES OF ZAMBIAN EMERALDS SALES

1984 - 1987

(DOLLAR PER KG)

YEAR	LARGE-SCALE MINES(KAGEM)	MEDIUM-SCALE MINES	SMALL-SCALE MINES	TOTAL
1984	-	35,728.15	8,882.48	32,951.89
1985	27,821.36	16,084.78	-	23,190.08
1986	9,362.93	31,153.85	13,029.26	10,413.20
1987	9,289.02	44,436.21	18,819.32	9,875.92

SOURCE: Calculated from Table 4-7

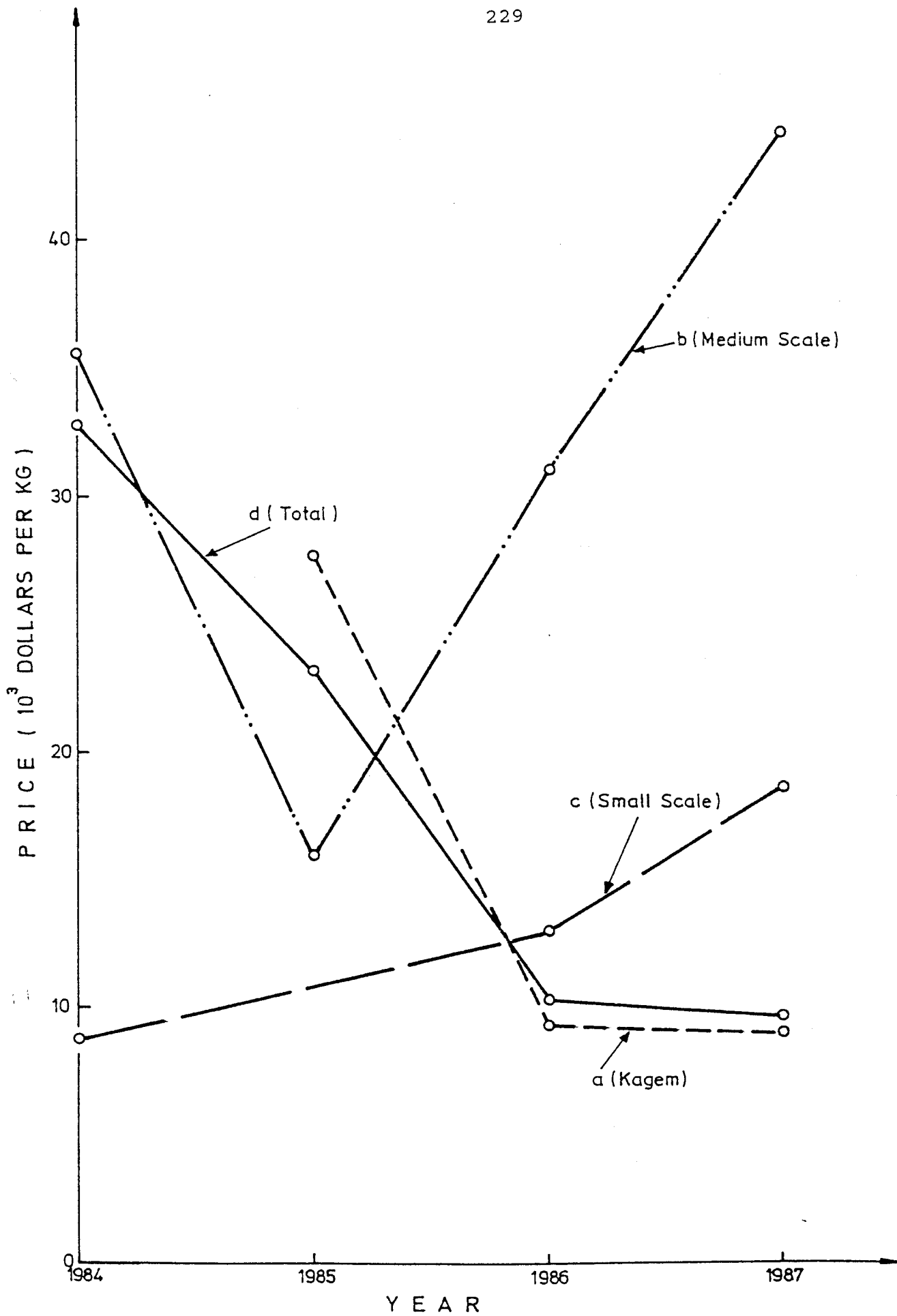


FIGURE 4 - 8 UNIT PRICES OF ZAMBIAN EMERALD
1984 - 1987

period 1984-1987 and Figure 4-8 illustrates the trend in this unit prices of the groups over this same period. It can be seen from Table 4-9 that the highest unit price of Zambia's emerald has been from the medium-scale mines. In addition, they have achieved consistent unit price increases over the period except in 1985. On the contrary, Table 4-9 and Figure 4-8 show that despite the considerable increases in Kagem's production over the period, its unit prices have been comparatively low. Kagem obtained its highest unit price in 1985. In 1986 Kagem's unit price dropped by 66 per cent against that of 1985, while in the same year the medium-scale operators obtained 94 per cent unit price increase compared to 1985. In 1987, the medium-scale and small-scale operators obtained 43 per cent and 44 per cent increases in their unit prices against 1986 respectively whereas Kagem showed a further 0.8 per cent decline in their unit price.

Kagem's situation regarding its consistent low unit prices over the period may be attributed to 2 main causes; the first is, probably, Kagem has been mining deposit with a declining grade over the period, or as previously discussed the price of the 49 per cent of Kagem's production sales to its minority shareholders at RMC reserve price is low. Figure 4-8 shows the trend in unit prices of Zambia's emerald sales. It can be seen that while unit prices for small and medium-scale operators

are increasing that of Kagem is declining. The total unit price of Zambia's emerald has also fallen drastically over the period. In 1985, there was a decline of 30 per cent in the total unit price against that of 1984. There was a further 55 per cent and 5 per cent decline respectively in 1986 and 1987. This substantial decline in the total unit price for Zambia's emeralds is obvious since it is a reflection of the negative trend in Kagem's unit prices. As previously indicated, Kagem supplied 61 per cent to 98 per cent of Zambia's marketable emerald over the period.

The medium-scale and small-scale operators do not categorise their production grades in their annual reports. Kagem however reports the grade categories. Table 4-10 shows the composition of Kagem's production over 1985-1987. From this table it can be seen that in 1985 the percentage of high grade emeralds in Kagem's total production was about 32 per cent. The high grade percentage declined by only 3 per cent in 1986. However, Table 4-9 shows that in the same year kagem's unit price declined by 66 per cent compared to 1985 unit price. There was a further fall in its unit price of 0.8 per cent in 1987 with a corresponding high grade decline of 0.6 per cent. Though the percentage of high grade emerald in Kagem's output shows a small decline over 1985-1987, the substantial fall in its unit price is not likely due to the company's emerald output composition. Taking

TABLE 4-10 COMPOSITION OF EMERALD PRODUCTION BY
LARGE- SCALE MINE (KAGEM MINING LTD.)
1985 - 1987^a

YEAR	HIGH GRADE EMERALD (KG)	LOW GRADE EMERALD (KG)	TOTAL (KG)	PERCENTAGE OF HIGH GRADE
1985	29.741	64.513	94.254	31.55
1986	98.374	243.431	341.805	28.78
1987	194.105	494.023	688.128	28.21

SOURCE: Mines Development Department

a= Production Excludes Beryl and Specimen

congnisance of the consistent high unit prices obtained by the small and medium-scale operators over the same period, combined with Kagem's output composition, it is more likely that the minority shareholders are paying low prices (reserve prices) for their 49 per cent emerald purchases from Kagem. However, the evidence of the reserve prices are not available due to confidential reasons.

Meanwhile, a joint venture for cutting emeralds, the Zambia Emerald Limited (ZEL) is being established in Zambia (Ndola) between RMC (with 51 per cent shares) on behalf of the Zambian Government, and a Brazilian company (49 per cent shares). ZEL will buy Kagem's output through RMC for cutting and subsequent export.

III. Delivery of Emerald from Small and Medium-Scale Mines to Reserved Minerals Corporation (RMC) and the Problems Involved

Once a substantial amount of emerald has been mined, the small and medium-scale operators or holders go through the following processes for the delivery of their proceeds to RMC. First, the holder has to travel to Kitwe to inform the Mines Safety Department (MSD) of his proceeds. Later, the MSD representative travels to the holder's mine, and in some cases transport for the former has to be

provided by the holder. Then, together with the MSD representative, they convey the emerald from the mine to a bank in Kitwe. In a subsequent time the MSD personnel and the holder again convey the emerald from Kitwe to the Bank in Zambia in Ndola. In Ndola, officials from the Geological Survey Department, RMC and the holder, grade and value the emeralds. RMC then continues further with the necessary marketing arrangements. According to the holders some of the banks charge them for holding their emeralds in their banks. For instance, Kafubu Minerals Co-operative Society pays K50 per day as holding cost to Zambia National commercial Bank, Kitwe. The payment is made irrespective of the contents of the "emeralds box" held by the bank.

This cumbersome emerald delivery procedure from individual mines is likely to encourage smuggling. In addition, such delivery procedure forces most operators to hold excess amount of emerald on the mine for a long time which is very unsafe, since those areas are prone to rampant thefts. The mine operators also complain that their proceeds sold to RMC are stocked for too long before payments are made resulting in severe working capital problems. For example, RMC stocked some of their emeralds for 9 months before the auction in October 1987. However, since the middle of 1987, RMC has agreed to pay 50 per cent to the operators on emerald delivery. In addition,

after auction, the mine operators can apply for 50 percent of their sale returns in foreign exchange to enable them import equipment.

In other words, most of the medium and small-scale operators complain that RMC's 10 per cent commission is too high since:

- (1) the operators assume the risk of keeping their emeralds in some of the banks;
- (2) RMC do not assist in collecting emerald from the mines;
- (3) final payments are made after auctions, which sometimes takes over 8 months; and
- (4) RMC does not assist in providing infrastructure.

Most of the miners also doubt RMC's general marketing arrangements due to its involvement in Kagem Mining Limited.

The analyses of the two main gemstones in Zambia (amethyst and emeralds) in this study show that the past pricing and marketing of gemstones in Zambia has not been very encouraging. As a matter of urgency therefore, an appropriate pricing and marketing policy has to be adopted to prevent any further loss of foreign exchange and Government revenue especially in the current economic

restructuring process of the country.

The New Economic recovery Programme, 1987-1988, confirms low Investments in Zambia as one of the factors which has contributed to the current economic recession(50). It indicates in addition that Zambia's Gross Fixed Capital Formation (GFCF) has fallen from 17 per cent of the Gross Domestic Product (GDP) at current prices in 1980 to 9 per cent in 1986. (see also Table4-11).

TABLE 4-11: GROSS DOMESTIC PRODUCT BY TYPE OF
EXPENDITURE AT A CONSTANT 1977 PRICES
(MILLION KWACHA)

YEAR	1984	1985	1986	1987-1988 projections
Gross Fixed Capital Formation	212	199	181	265
Gross Domestic Product	2013	2041	2052	2095
Mining Contribution	200	185	174	176

SOURCE: The New Recovery Programme. CSO AND NCDP, 1987

The interim National Development Plan, (1987-1988) therefore, aims at a substantial increase in domestic investment to ensure the recovery of the economy. To achieve this objective, Zambia will require substantial increase in its GFCF. The Interim National Development Plan as a result seeks to increase GFCF by more than 44 per cent compared to 1986 (Table 4-11). The Interim National Development Plan further indicates that the possibility of the projected GFCF increase will include increased exports of non-traditional exports particularly of "precious and semi-precious" stones (gemstones). Consequently, the importance of an appropriate and effective pricing and marketing policy for Zambia gemstones cannot be overemphasized if the industry is to contribute its quota to stimulate the recovery of the Zambian Economy.

4.3 Other Coloured Stones in Zambia

The following gems have also been found in Zambia since the discovery of emeralds. They include; apatite, kyanite, diopase, tourmaline, aquamarine, and gem quality garnet(38), see Figure 4-1. The commercially significant deposits are those located in the eastern Province. These include: the Hofmeyer near Nyimba where tourmaline is mined; the Simalana area, the source of garnet; and the Lukusuzi-Lundazi area which is the main source of

aquamarine but which also supplies tourmaline (Figure 4-1).

Aquamarine and multi-coloured tourmaline occur in cavities within the boarder zones to the pegmatites. Apatite is usually associated with aquamarine and lithium mica with tourmaline. Aquamarine usually occurs as large crystals with irregularly different colour patches. In addition, these large aquamarine crystals look fractured but have within them gem size pieces of pale blue to sea green colour. The quartz associated with aquamarine has a pink hue.

Abundant schorl rosettes within the pegmatites is an indication of the presence of tourmaline gem. Tourmaline found initially were yellow to green or brown and these are still the most common, however, pink to red tourmaline are now known particularly at Hofmeyer.

In addition to tourmaline, aquamarine and garnet, which are produced commercially, rose quartz and amazonite are found within the pegmatites. These rose quartz and amazonite can be used for decorative purposes. According to Tether et al. (38) agates occur at Livingstone and other places, though the evaluation of their gem quality has not been made.

Coarse kyanite has also been recorded at several

localities in Zambia (38). They are mostly dull blue grey in colour but at the Leopard's Hill locality, attractive, sladed, translucent, green crystals up to 10 Cm in length occur as surface float from quartz-biotite-sericite-kyanite schists within the Chalenga Gneiss. Corundum has as well been recorded at two localities both associated with kyanite(38). None of gem quality has, so far, been found(38).

Besides, Tether et al.(38) further report the existence of other pegmatitic gemstones in other parts of Zambia, particularly in Central and Southern Provinces. However, further investigations are required for the extensiveness of these gemstone sources as well as the resource and reserve situations(46).

4.3.1 Production of Tourmaline and Aquamarine in Zambia

Commercial production of tourmaline and aquamarine in Zambia is in the eastern province and is still in the infant stage.

Presently, Mindeco Small Mines is the only mining Company producing tourmaline in Zambia. The major aquamarine producers include Galfab Engineering Limited and Kuber Mining and Metal Engineering Company Limited. So far, 9 mining and prospecting licences each have

been issued for mining and prospecting of these coloured stones in Zambia(44).

Mining operations are mainly small-scale and are very similar to the small-scale mining operations previously described under Zambia's emerald and amethyst mining.

I. Analysis of Tourmaline and Aquamarine

Production in Zambia

Table 4-12 illustrates the production of tourmaline and aquamarine over 1983-1987 and 1985-1987 period respectively. It can be seen from Table 4-12 that commercial tourmaline production started in Zambia in 1983, and two years afterward, production dropped drastically by 97 per cent each compared to 1983 and 1984 respectively. So far Mindeco Small Mines cut and polish most tourmaline it produces locally and market them in domestic duty free shops.

The main problem facing tourmaline producers in Zambia is lack of market. In addition, most of the tourmaline mined is of poor quality.

Table 4-12 further shows that aquamarine mining in Zambia is just in the infant stages. Relatively large quantity of aquamarine was produced only in 1987. There has not

TABLE 4-12 TOURMALINE AND AQUAMALINE PRODUCTION IN
ZAMBIA 1983 -1987 (KG)

<u>TOURMALINE PRODUCTION</u>					
Mining Company	1983	1984	1985	1986	1987
Mindeco Small Mines Ltd. (Total)	452	460	12	Nil	Nil
<u>AQUAMALINE PRODUCTION</u>					
Kuber Mining and Metal Mining Co. Ltd.	-	-	-	-	57.53 [^]
Galfab Engineering Ltd	Nil	Nil	2.25	0.38	10.53*
TOTAL(Aquamaline)			2.25	0.38	67.58

SOURCE: Mines Development Department

[^] = October to December

* = January to September

been any substantial sales of aquamarine in Zambia so far. As previously discussed the Reserve Mineral Co-operation is the sole marketing agent for all gemstones in Zambia including tourmaline and aquamarine.

4.4 The Gemstone Industry in Zimbabwe

Emerald and other coloured stones in Zimbabwe are found mainly in the Sandawana deposit. The Sandawana deposits are of gem quality and have been mined since 1957. A number of other emerald occurrences are known and worked at Chikwanda, Brentwood and Filabusi. Aquamarines are also found in Karoi, and amethyst, sapphire, agate - and, at one time although no longer, diamonds from Somabula.

The main coloured stone presently mined in Zimbabwe includes; emerald, aquamarine, chrysoberyl and some garnet. In addition, magnesite, howlite, aventurine quartz and calcite are mined for ornamental purposes(64).

The deposit of Sandawana is mined by Rio Tinto. The emeralds in this area occur both in pockets and scattered through a biotite schist at the contact of pegmatite. In the first instance, the emeralds are hand picked, and the biotite schist is then taken to weathering bays, where by

using water the rock disintegrates. The latter process may take up to two years or more. Mining at the Sandawana deposit was initially done by open-cast method, but underground mining methods are presently being employed.

Small-scale mining of coloured stones in Zimbabwe is done by families, individuals and small groups. The small-scale operations are basically labour intensive and simple hand tools are used. They mine by open cast methods.

According to Fairbian(27), exports of emerald alone in Zimbabwe were valued at 2.5 million Zimbabwean dollars in 1981. The Metal Marketing Corporation of Zimbabwe (MMCZ) also reports the current average yearly production of rough quality emeralds as about 800 Kg. In addition, 1000 to 2000 carats of cut and polished stones should always be available before buyers can be invited, and sales are made at an average of twice per year each for rough and cut stone respectively.

4.4.1 Marketing of Gemstones in Zimbabwe

The Gemstone Division of the Metal Marketing Corporation of Zimbabwe (MMCZ), a Government marketing institution formed in 1982, does the marketing of all gemstones in Zimbabwe.

I. Selection of Buyers

Earlier marketing of gemstones in zimbabwe was done by agents. For instance, the deposit of Sandawana mined by Rio Tinto was marketed by a Paris dealer. The former agents established demand lines through publicity in Geneva. Therefore, when MMCZ took over as the sole marketing institution, it maintained some of the old buyers. In addition to the demand lines which have been established through the old buyers, over the years an internal grading system has been adopted and agreed upon by MMCZ and the old buyers. Though, MMCZ will like to trade with the old buyers, it does not hesitate to drop buyers who consistently bid low and also fail to conduct themselves according to agreed marketing arrangements. When a buyer is dropped, buyers from different countries other than the previous buyer's own are usually sought for. This policy enables MMCZ to explore other international markets.

MMCZ markets the coloured stones in two forms;

- (1) cut and polished stone, and
- (2) rough stones.

The cutting is done within Zimbabwe from better quality facetable materials. The rough stones consist of poor quality or too small stones which are not amenable to economic cutting locally. According to Ncube(64)

the major markets for the country's cut and polished stones are mainly in Western Europe; West Germany, Switzerland, France and United Kingdom. Exports to Japan are however small. Rough stones are marketed exclusively to India where labour costs are low and dealers can therefore process them economically. The volume exported to each country was, however, unavailable due to confidential reasons.

II. The Mode of Marketing in Zimbabwe

The mode of marketing of coloured stones in Zimbabwe is by invitation(via mail). Potential buyers from the previously mentioned countries are invited. The creditability and financial standing of such buyers are well verified by MMCZ.

In transacting the marketing itself, at least two such buyers are introduced to the sight where identical parcels are shown to each buyer at the same time while they are in two different rooms. This process helps to eliminate the possibility of collusion by the buyers. During this simultaneous independent bidding process, each buyer sets his own price, though each parcel bears MMCZ asking price. In this process of moving from buyer to buyer price discussions take place, and if the buyers' counter offer

is within MMCZ's expected price the deal can be concluded. For cut and polished gems each invited buyer has a chance of taking at least a parcel at the agreed price, whereas for the rough stones the buyer who makes the best offer takes the entire bulk available. The latter procedure helps the dealer to regulate the supply of the roughs and therefore helps to control price for the rough stones. MMCZ holds stocks which help it to regulate the sale of the stones.

III. How MMCZ Sets Its Prices

MMCZ embarks on thorough market survey internationally. It often attends international Trade Fairs on Jewellery Fairs and there pose as a buyer bargaining from one stand to the other. Consequently, MMCZ obtains a cross-section of retail and wholesale prices. Based on these cross-section prices, MMCZ sets prices for its coloured stones. Slightly higher prices than the cross-section prices are always put on the various parcels. MMCZ makes sure that during marketing, and for each parcel, at least three buyers' counter prices are available for comparison with its asking price. Future prices for different grades are also set based on previous MMCZ's sale prices. In setting future prices however, the prevailing demand and supply conditions are taken into consideration. In order to avail itself with prevailing international situation,

MMCZ makes visits in between sales to Europe where it embarks on frank discussions with gemstone dealers. In addition, similar independent discussions are made with stone dealers who travel to Zimbabwe to buy stones.

IV. MMCZ Internal Pricing System for Coloured Stones

MMCZ buys all rough coloured stones from producers in Zimbabwe, it cuts the facetable ones for onward marketing. The cut and rough stones are sold on different occasions.

The Gemstone Division of MMCZ operates an internal pricing system, and producers are paid on delivery of coloured stones. The price for these rough stones are set by MMCZ and remains fixed over a period of time. Consequently, the internal price of coloured stones does not reflect the price fluctuations on the international market. The purchase prices are set as close as possible to international market prices, so as to check smuggling. The producers receive reasonably higher prices for their rough stones, and this is accounted for by the higher prices MMCZ receives for its locally cut stones. These local prices are however adjusted after certain period of time to reflect the international market conditions.

It is a policy of MMCZ to charge a 10 per cent commission

for this internal marketing arrangements. In this case MMCZ assumes all the risk. However, when there is a great difference between the price paid to the producer and that from actual sales on the international market, MMCZ makes sure to share the bonanza with the producers.

On the other hand, if MMCZ acts as an agent for a producer, the latter has to assume all the risk and in addition wait finally for payment to be made from the exports of the stones after which the producer is paid. In this case MMCZ receives a commission of about 1 per cent.

Generally, Zimbabwe's mode of pricing and marketing of her gemstones is reasonably effective.

4.5 The Gemstone Industry in Tanzania

Gemstone mining existed in Tanzania in the late 1950s around Arusha, however, commercial production commenced in 1965. Gemstones are known to exist in many parts of Tanzania, but the commercially significant ones are found in the Arusha, Kilimanjaro, Tonga, Morogoro and Dodoma regions. The main coloured stones found in Tanzania include; ruby, sapphire, emerald, tanzanite, tourmaline, the gem varieties of garnet, amethyst, cordierite and zircon. Diamonds are also found in Tanzania.

Gemstone mining operation in Tanzania is both on small and large-scale. Many small-scale operators recover the stones by working river sands and gravels or working unconsolidated surface material or near surface bed rocks. Basic hand tools like picks, sieves etc. are mainly used. These gemstone miners do not embark on any systematic development, as a result, in many mining areas, pits are created at random, and substantial amount of economic veins are left unmined. Almost vertical benches are very common, leaving the mining environment very unsafe. The production of majority of these small-scale miners is reported to be low or very erratic in both quantity as well as quality(51).

The investment cost for the small-scale mines is very low

compared to other metal mines, since the total investment is basically the amount required to buy the very simple tools. According to the Tanzanian Ministry of Energy and Minerals(51), such small-scale investment may require few 1000 Tanzania shillings(though the exact amount was not indicated). They further report that other medium and large-scale gemstone operators may require investment of several millions of Tanzanian shillings. For example, the diamond mines of Mwadui mined by conventional open pit methods invested over 500 million Tanzanian shillings of which a significant proportion involved foreign funds as well as a high level of technology in equipment and managerial expertise(27, 51). The Ministry of Energy and Minerals in 1983 reported that the value of coloured stones purchased almost entirely from small-scale miners was 2.5 million Tanzanian shillings(51). The Tanzania Gemstones Industries after cutting a portion of the stones sold the entire coloured stones for more than 6 million Tanzanian shillings(51).

4.5.1 The Past Control of the Gemstone Industry in Tanzania

The discovery of tanzanite(blue vanadian zoisite) near Merelani in 1967 triggered gemstone prospecting in the Arusha area in general. As a result of a rush for claims and an increase in illegal gemstone mining in this area, the Government enforced control by enacting the Gemstone

Industry Act of 1967. During this time tanzanite, gem garnets and tourmaline were those mainly mined. Subsequently, ruby was mined at Longido, Arusha region, and sapphire at Uмба.

In an attempt to control the gem marketing three private companies were initially issued dealers licences to buy gemstones in Tanzania. It was realized that in order to evade royalty payments, these companies were embarking on the smuggling of a large proportion of the gemstones out of the country. As a result, the Government decided to control the industry by taking over the major gemstone mines including Merelani, Uмба and Longido. Consequently, the Tanzania Gemstone industries Limited(TGI) was formed in 1969 and was given the sole right to mine and sell all gemstones from the above mentioned mines, in addition to selling gems from small-scale miners. TGI charges a commission of 15 per cent from private operators.

TGI however, found itself beset with financial, managerial and security problems and as a result, could not operate profitably. Illegal mining became so rampant as private small-scale miners were unwilling to sell to TGI.

In an attempt to further check these illegal dealings all private gemstone claims operated by private individuals were given to co-operatives. It was anticipated that

members of the Co-operatives would exercise control over mining and therefore help to reduce illegal dealings. On the contrary, many of the previous private owners formed themselves into some kind of co-operatives, and in some cases the individuals enlisted as co-operative members were non existent or were family members of the previous owners. Thus, the illegal mining and dealings persisted. In addition, poor quality stones were mainly sold to TGI, while the bulk of good quality sales went to smugglers for onward sales abroad. The Ministry of Energy and Minerals (51) insists that during this period illegal production and sale continued due to the fact that there was little or no improvement in security arrangements or in the monitoring and regulating capability of the official agencies. In addition, they assert that there was no improvement in the financing and marketing ability of TGI. According to the Tanzania Task Force (51) the security forces were themselves involved in the illegal practices. The Task Force further argues that the arrest of culprits with the imposition of only small sentences or fines by courts will not help check smuggling of the precious stones.

Most of the earlier co-operatives formed in the gemstone area have now been disbanded leaving about 80 private claims, in the hands of individual miners.

The following were the reasons advanced by gemstone mining co-operatives regarding their unwillingness to sell to TGI:-

- (a) Prices offered by TGI were too low.
- (b) The 15 per cent commission charged by TGI was too high.
- (c) that cobbing of unsorted material by TGI was carelessly done, resulting in damage of good stones, and in some cases good stones were exchanged for bad ones by the TGI sorters
- (d) that TGI is occasionally slow in giving payments, and that their buying office in Moshi is too far from the mines themselves.

4.5.2 The Evolution of the Pricing and Marketing of Gemstone in Tanzania Since Independence

Pricing and marketing of gemstones in Tanzania has gone through series of change since independence. Tanzania has so far tried four different gemstone pricing and marketing systems amidst disappointment from banks and agents.

A study of the gemstone exports systems by Ncube (52) reviews Tanzania's four different systems of pricing and marketing by a government marketing institution since

independence as follows:-

I. The First System

All the producers of gemstones as a government policy sold their gemstones to a government buying centre where the stones were evaluated, priced and exported. The government buying centre through advertisements abroad specified quantities and prices of gemstones available for sale. These advertisements enabled foreign buyers to be informed and to put in their requisition by mail. The centre on receiving requisitions from foreign buyers made the material available for examination in the buyers own country through an authorized bank in Tanzania. The Tanzania bank worked through a foreign bank in the buyer's own country. The buyer examined the parcels before the foreign bank officials after which he decided to or not to buy the stones. In the case where the buyer refused to buy the stones the foreign bank sent the parcels back to Tanzania. Payment for stones bought was made with foreign cheque.

II. Second System

In this system producers similarly sold their stones to the government buying centre for evaluation, pricing and subsequent foreign advertisement.

The foreign buyer requested certain category of stones to be sent to him for examination before concluding the contract. However, the buyer had to send a Bank Guarantee or letter of Credit to cover the value of the stones requested.

The centre on receiving the guarantee mailed the requested stones direct to the prospective buyer. In this arrangement the buyer had the right to examine the stones alone before making his final decision on the deal. The buyer had two alternatives, he could buy all the stones requested or send all back.

III. Third System

The government buying centre retained its role as the sole marketing institution for exports of gemstones from all producers.

In this system, after the centre's evaluation and pricing, the stones were sent to an agent abroad against some guarantee from this foreign agent. In addition, the foreign agent had to be a member of some international Gemstone Marketing Institution or Bourse. The foreign agent then arranged for the marketing of the stones, and he received 10 per cent commission. The handling charges during the marketing process abroad was borne by the

foreign agent. The government centre's share of the sales in foreign exchange, together with the unsold stones were later sent back to Tanzania.

This was the marketing arrangement used by Rio Tinto for the export of emeralds in Zimbabwe before the Metal Marketing Corporation of Zimbabwe was established.

IV. The Fourth (The Present System)

The government buying offices established in Moshi are supposed to buy all gemstones from producers, evaluate and price them.

After the centres advertisements abroad, the prospective buyers have to travel to Tanzania (Moshi) to buy stones they require. In this system no stones are sent out on requisition.

In brief, the overall evolution of gemstone marketing in Tanzania has become necessary due to illegal gemstone dealings by producers and middlemen. As a result of such dealings the country has lost huge foreign exchange, and solution has to be found for such marketing malpractices in Tanzania.

4.6 Short Review of Pricing and Marketing of some Major Gemstone Producers in Developing Countries

As previously discussed Madagascar, Sri-Lanka and Brazil are among the world's largest gemstone producers. According to a study conducted by Ncube (52) the pricing and marketing of gemstones in these countries are as follows:

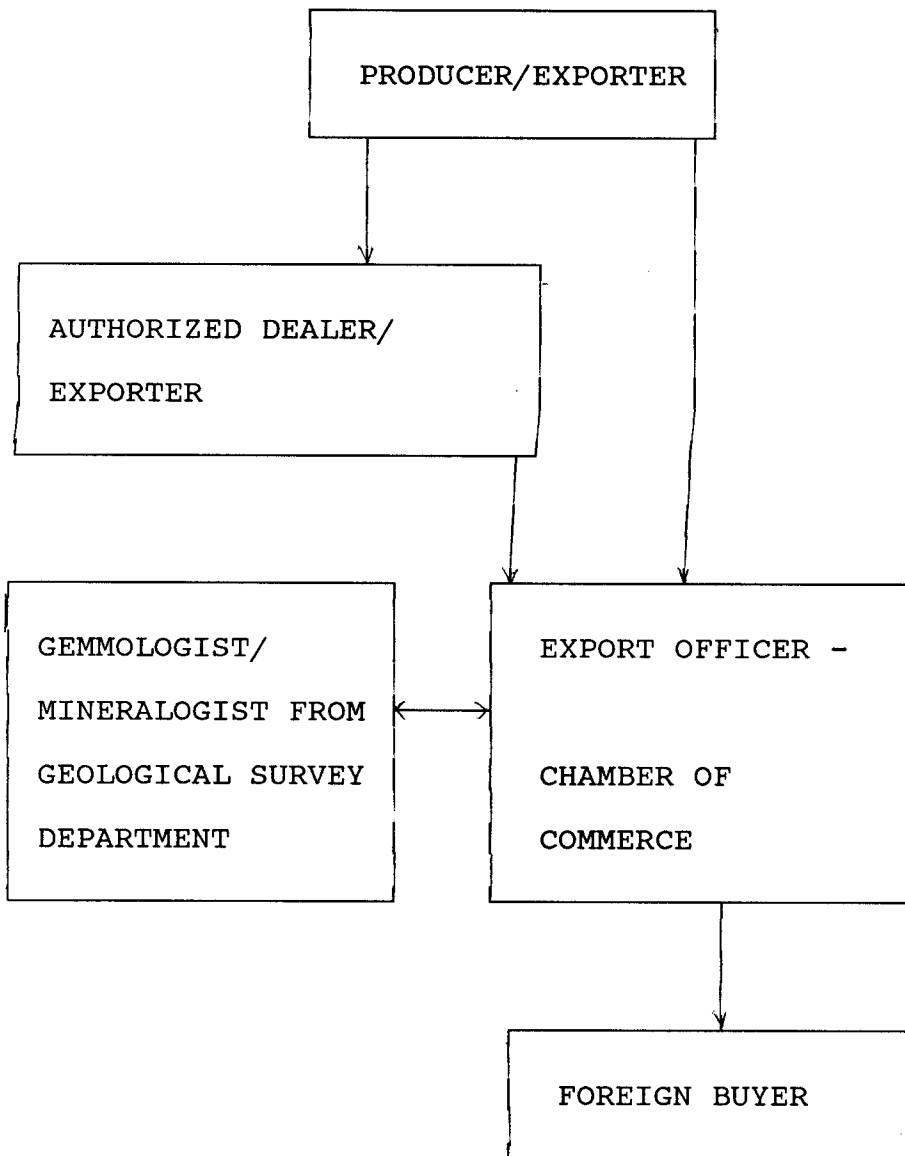
Figure 4-9 shows the marketing channels for Madagascar gemstones. As a policy all gemstone exports is through the Chamber of Commerce. Producers who are not authorised to export sell to authorized stone dealers.

If authorized exporters decide to export uncut stones they have to do this through the Chamber of Commerce. An Export Officer from the Chamber of Commerce, with the assistance of a Mineralogist or Gemmologist from the National Geological Survey Department, confirms the identity of the stones and cross-check their declared values before issuing an export permit for the dealer. All packets of stones must be sealed before they leave the Mineralogist/Gemmologist office.

The prospective buyer has to pay the declared export value in foreign currency through the National Bank before stones can be exported and must be exported through the

4.6.1 Madagascar

FIGURE 4-9 MARKETING CHANNELS FOR MADAGASCAR GEMSTONES



customs. In addition, all cut stones has to go through the Ministry of Trade and Commerce (via Customs) to the buyer.

4.6.2 SRI-LANKA

FIGURE 4-10: MARKETING CHANNELS FOR SRI-LANKA'S GEMSTONES

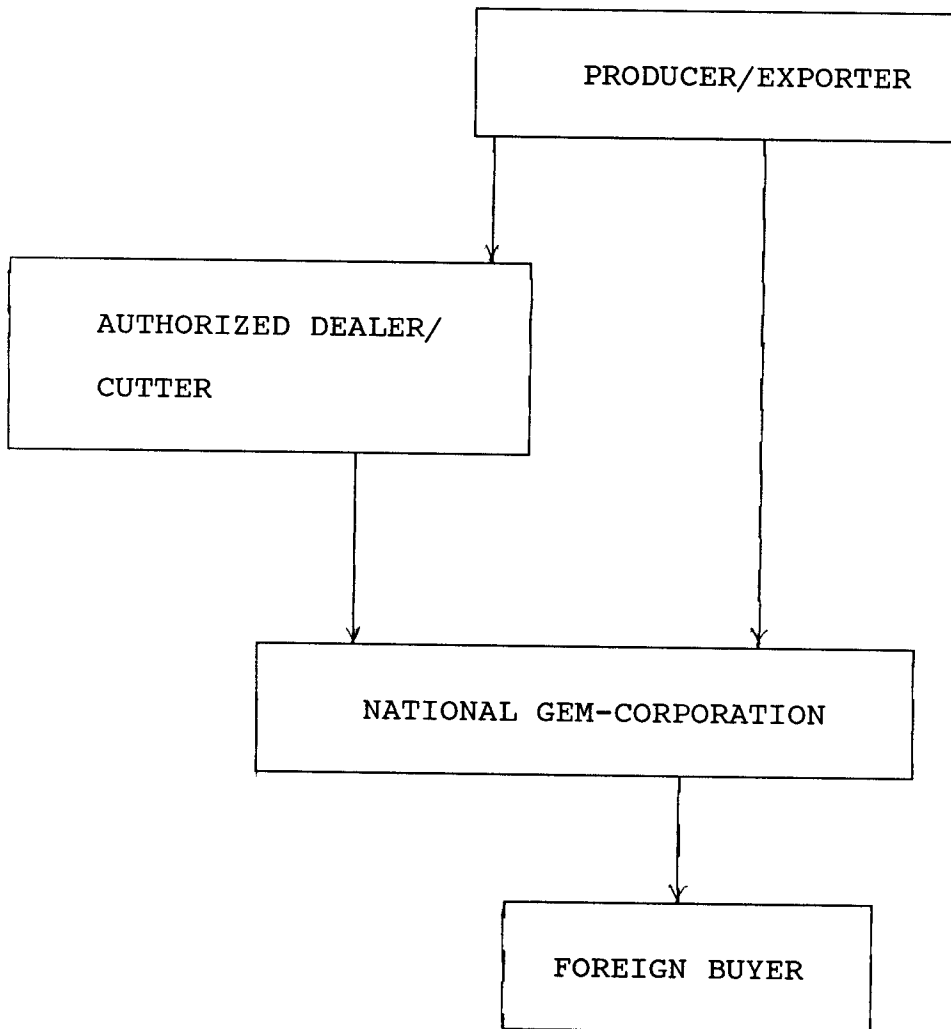


Figure 4-10 shows the marketing channels for gemstones in Sri-Lanka. Sri-Lanka has generation of experience in the gemstone industry and most stones leave the country in the cut form.

Most producers in Sri-Lanka are also cutters and they sell their stones cut or uncut to authorized dealers or exporters. Dealers obtain export permits from the National Gem-Corporation after the re-evaluation of the dealer's stones. It is a requirement that in applying for an export permit, the dealer declares the type, quality, quantity, selling price as well as the name and address of the prospective buyer. If the Corporation after re-evaluation of a dealer's stones find the declared price too low, the Corporation buys the stones themselves for subsequent selling at a higher price. However, the previous buyer is made aware of the change in price. If this prospective buyer refuses to buy the stones at the new price, the Corporation then sells to a new buyer at the new price. All payments of gemstones is through the National Bank in foreign cheque.

4.6.3 Brazil

Brazil has so far tried 2 systems, including the present systems. The old Brazilian system resembles the previously described Sri-Lanka's system. CASEX, a

Brazilian Government Institution played the role of Sri-Lanka's National Gem-Corporation.

I. The New Brazilian System

Figure 4-11 shows the marketing channels for Brazilian gemstones. The underlying objective of this system is to minimize the quantity of uncut stones leaving the country and therefore boost the domestic gemstone cutting industry.

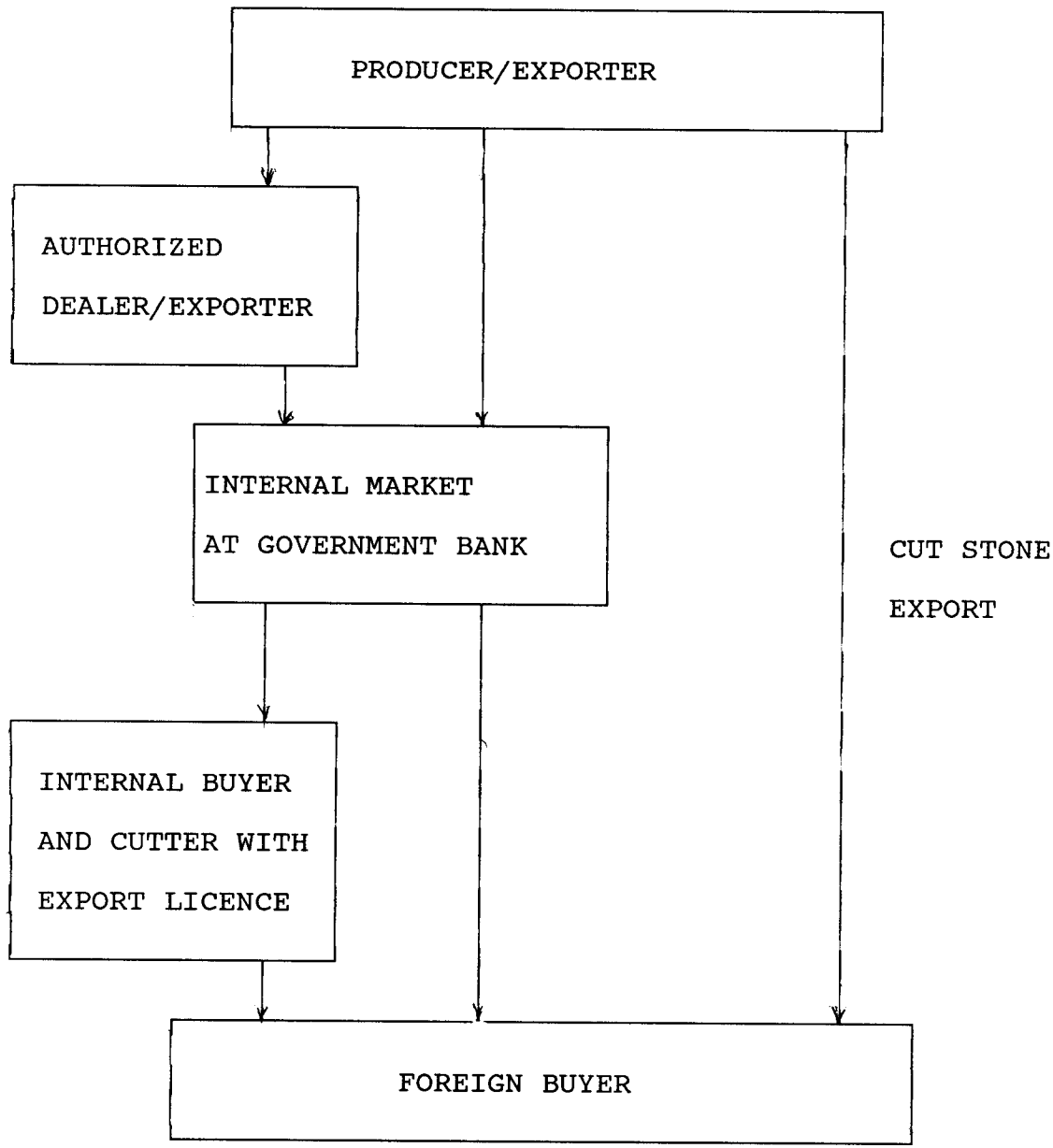
Producers who are not cutters sell to internal buyers who may or may not be cutters. Any dealer or producer who likes to export uncut stones has to do so through a government marketing centre (CASEX) at the National Bank. In applying for export permit to export uncut stones, the dealers or producers have to declare the type, quality and selling price of their stones. CASEX then displays the stones internally, making them available to internal buyers. Any internal potential buyer should be a registered cutter and should be prepared to pay 10 per cent commission to CASEX for handling costs. If after 21 days the stones are not bought internally, the owner is given the permit to export them at the declared value.

All cut stones in Brazil are exported through the

Ministry of Trade and Commerce and are not subjected to any controls. All payments are also made through the National Bank.

I. THE BRAZILIAN SYSTEM

FIGURE 4-11: MARKETING CHANNELS FOR BRAZILIAN GEMSTONES



PRICES OF U.S. CUT DIAMONDS, BY SIZE AND QUALITY

Carat Weight	Description color ¹	Clarity ² (GIA terms)	Price range per carat in 1986	Average price per carat	
				June 1985	June 1986
0.04-.07	H-I	VS	\$440- \$420	\$420	\$420
.04-.07	H-I	SI ₁	420- 380	380	380
.08-.14	H-I	VS	470- 460	460	460
.08-.14	H-I	SI ₁	440- 420	420	420
.18-.22	H-I	VS	850- 680	750	750
.18-.22	H-I	SI ₁	700- 600	700	700
.23-.29	H-I	VS	1,200- 900	900	11,750
.23-.29	H-I	SI ₁	900- 750	750	900
.30-.37	H-I	VS	1,400- 1,000	1,175	1,475
.30-.37	H-I	SI ₁	1,000- 800	900	1,250
.46-.49	H-I	VS	1,700- 1,300	1,475	--
.46-.49	H-I	SI ₁	1,400- 1,100	1,250	--
.70-.09	H-I	VS	2,200- 1,800	2,000	2,175
.70-.09	H-I	SI ₁	2,000- 1,400	1,600	1,800
1.00	D	IF	16,500- 9,500	611,500	612,000
1.00	E	VVS ₁	9,450- 4,100	64,550	65,000
1.00	G	VS	3,700- 2,500	63,000	63,150
1.00	H	VS ₂	3,100- 2,000	62,400	62,525

SOURCE: GEMSTONES, 1986. Preprint from the 1986 Bureau of Mines & Minerals Yearbook.*

¹Gemological Institute of America (GIA) color grades D-colorless, E-rate white; and H-G-I--traces of color.²Clarity: IF-no blemishes; VVS₁ very, very slightly included; VS-very slightly included; VS₂-very slightly included, but more visible; and SI₁-slightly included. ⁶The Diamond Registry Bulletin V.16 No.7

July 1985

*United States Department of the Interior

PRICES OF U.S. CUT COLORED GEM STONES, BY SIZE¹

Gem stone	Carat Weight	Price range per carat in 1986	Average price per carat June 1986
Amethyst -----	1	\$6- \$10	\$8
Aquamarine -----	1	100- 250	175
Emerald -----	1	1,350-3,000	1,775
Garnet, tsavorite -----	1	700-1,200	950
Ruby -----	1	1,800-3,300	2,150
Sapphire -----	1	450-1,300	725
Tanzanite -----	1	275- 450	354
Topaz -----	1	6- 9	7.50
Tourmaline, green -----	1	40- 250	145
Tourmaline, pink -----	1	50- 300	175

SOURCE: GEMSTONES, 1986. Preprint from the 1986 Bureau of Mines & Minerals Yearbook.
United States Department of the Interior.

¹Fine quality

⁴The Gemstone Registry Bulletin. V.3, No.11, December 130, 1985 p.8;
and v.4, No. 11, December 31, 1986, p.8

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