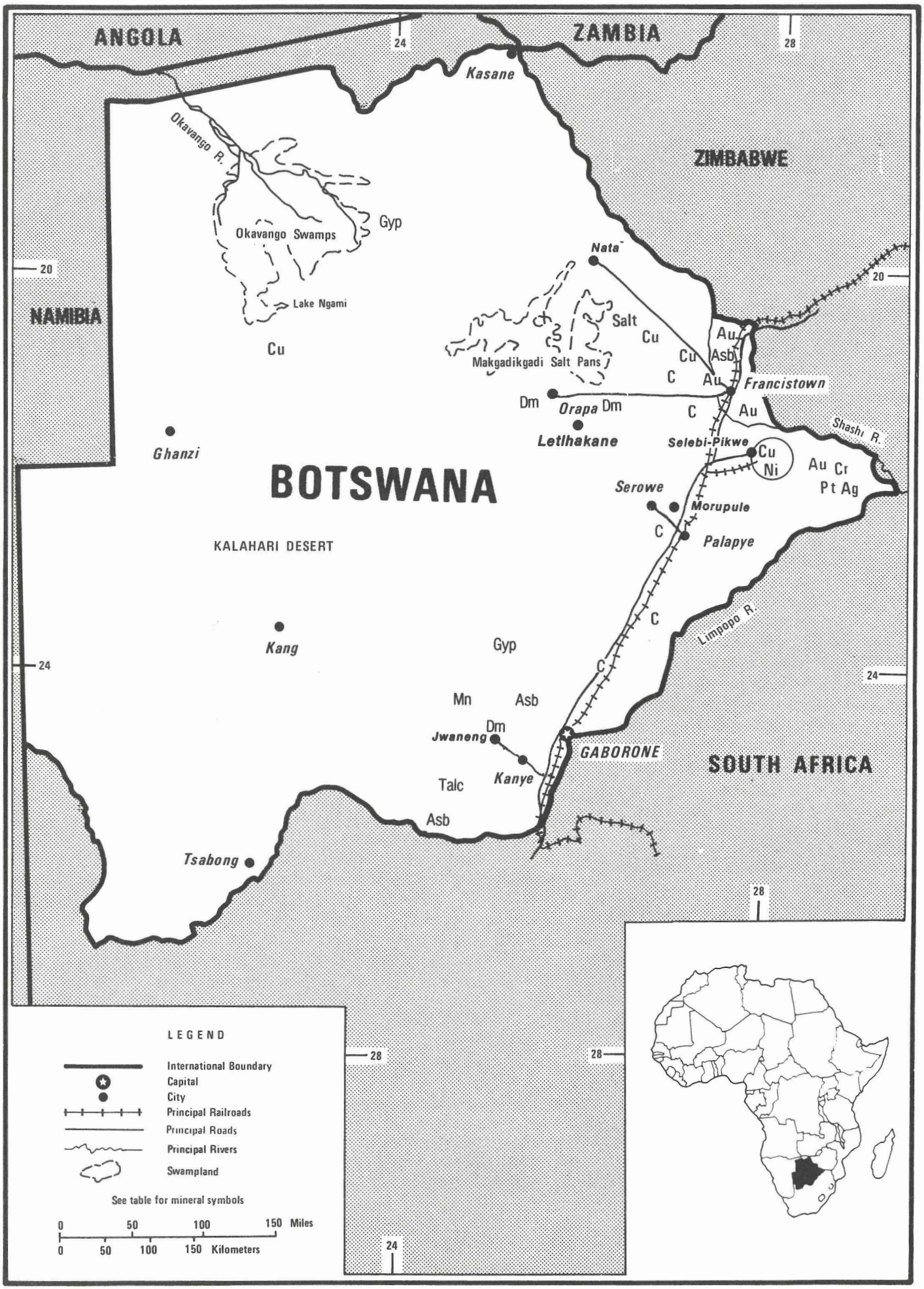
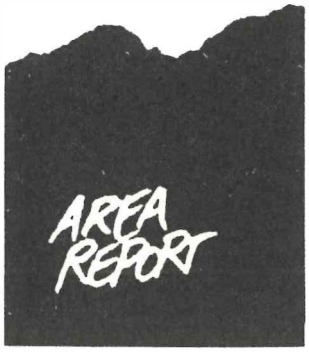

ANGOLA
ZAMBIA
ZIMBABWE
NAMIBIA
BOTSWANA
SOUTH AFRICA
KALAHARI DESERT
Kasane
Okavango R.
Okavango Swamps
Gyp
Lake Ngami
Cu
Nata
Salt
Cu
Au
Asb
Makgadikgadi Salt Pans
C
Francistown
Dm
Orapa
Letlhakane
Ghanzi
Shashi R.
Selebi-Pikwe
Cu
Ni
Au Cr
Pt Ag
Serowe
Morupule
Palapye
Limpopo R.
Kang
Mn
Asb
Jwaneng
GABORONE
Kanye
Talc
Asb
Tsabong
20
24
28
LEGEND
International Boundary
Capital
City
Principal Railroads
Principal Roads
Principal Rivers
Swampland
See table for mineral symbols
0 50 100 150 Miles
0 50 100 150 Kilometers



The mineral economy of Botswana

By Jerker Carlsson

In our series on mining in the SADCC countries Jerker Carlsson looks at Botswana, "one of the few buoyant economies" in Africa today.
This article in our series on mining in the SADCC countries provides an insight into the basic structural features of Botswana and its mining industry.
The article is divided into two parts. Part one attempts to characterize the Botswana economy and the role of the mining sector. Part two provides an analysis of the mining industry with respect to ownership, production and the government's mining policy.

Jerker Carlsson holds a Ph D in Economic History at the University of Gothenburg, Sweden. He is presently working with the development of small scale industry in Africa. He is also a member of the RMG.
Address:
Jerker Carlsson, Vasagatan 49, S-331 00 Värnamo, Sweden.

In a crisis-ridden Africa Botswana today appears as one of the few buoyant economies. Based on huge mineral resources, this expansion has created a situation where Botswana exhibits a very favourable balance of payments situation. In his budget speech in early 1986, the Finance Minister Peter Mmusi reported that in 1985 there had been a substantial increase in diamond earnings, with foreign reserves at record levels, a visible trade surplus and an increased balance of payments surplus. This boost to the economy was, however, mainly the result of the sharp depreciation of the pula (BWP) against major Western currencies. The Finance Minister therefore warned that it would be hazardous to plan ahead on the assumption that these favourable conditions would last for a long time. This situation, by no means unique to Botswana, raises the question to what extent Botswana's experience can be characterized as a development process containing the seeds of structural change, or is just another case of growth without development.

The macro-economic features of Botswana

The start of diamond mining in 1971 initiated a new era in Botswana's economic development. A significant switch occurred between agriculture, whose share of overall GDP contracted, and mining, whose contribution to GDP rose spectaculary. Table 1 below shows this process for the period 1976/77 to 1983/84.

During this time agriculture declined, from 24 per cent of GDP in 1976/77 to 6 per cent in 1983/84. Mining, on the other hand, rose from 13 per cent to 32 per cent over the same period. Similar dramatic changes were not found in any other sector, although trade recorded a modest growth in its share from 18 per cent to 23 per cent. Manufacturing and general government even declined somewhat.

Mining's contribution to capital formation is not, on the other hand, particularly significant apart from a few years in the early 1980s as can be seen from Table 2. Quite common for this kind of raw material based economy is the important role of the government sector for maintaining the investment level.

The 1970s and early 80s was a period when Botswana's dependence on mining deepened considerably. This pattern is clearly visible when it comes to external trade as Table 3 below shows. Diamonds clearly dominate with 60 per cent of total export value in 1980, rising to 71 per cent in 1984. Copper-nickel matte accounted for 22 per cent in 1980, but fell to 9 per cent in 1984. But still, together they account for about 80 per cent of Botswana's export trade in value terms.

Botswana's external position is very favourable indeed, particulary when compared to other African countries. Diagram 1 shows the development on her current and capital account.

From the late 70s the overall balance improved dramatically, except for a dip in 1981, and reached 165 M BWP in 1984. A major contributing factor was the large inflow of private longterm capital.

Botswana's revenue structure clearly reflects the dominance of mining in general, and diamonds in particular, in the national economy. In 1985, 686 M BWP came from diamonds (57 %) of total revenue, 194 M BWP from the Southern African Customs Union (16 %) and 109 M BWP from mineral taxes. Total revenues reached over 1 G BWP.[1]

Direct mining activities do not constitute an especially important employer of labour. Total private/parastatal employment was 47 500 in 1979 and 70 500 in 1984. Mining accounted for 13 per cent in 1979 (6 300) and 11 per cent in 1984 (7 500).[2] Available statistics does not give any possibility to measure employment in other sectors generated through their contacts with the mining companies. But clearly, backward link-

ages to, for example, manufacturing and electricity and water must be of some importance.

In conclusion then, the present rather favourable economic situation of Botswana is the result of a development process which started in the mid-1970s. This process possesses some very distinct, and familiar features:

- A rapid and unbalanced growth in the GDP.
- A rapid growth in the contribution of mining to total GDP.
- A considerable reduction in the relative and absolute contribution of agriculture to GDP.
- A quickly growing external trade, fuelled by mining activities.
- A strong growth in government revenues, primarily caused by mining revenues and the Customs Union with the RSA (SACU).

Can this process be sustained?

Although the economy experienced a temporary slump in 1980—82, growth resumed from 1982 onwards largely as a result of the start of production from the new Jwaneng diamond mine. The economy also received fuel from the depreciation of the pula. These two components — the exchange rate of the pula and the international minerals market — are quite essential when trying to predict the immediate future of a mineral economy like Botswana. Presently Botswana is very dependent upon diamond production and international diamond prices. Few if any of the other economic sectors can be expected to contribute anything of significance to the general growth of the economy.

Price movements on the international diamond market is of crucial importance to Botswana. For the coming years the Botswana government expects diamond prices to move slowly upwards.[3] The structure of the international diamond market is, however, complicated in the sense that it is more or less completely controlled by the De Beers dominated Central Selling Organisation (CSO), which is in a position to determine prices. This leaves a country like Botswana in a situation where it will have very little control over the crucial marketing aspects of diamond production. A control which would be desired as market considerations can easily make or break the Botswana economy.

Thus, with an economic structure heavily dependent on the extraction of minerals and with very little room for manoeuvrability on the international market for these minerals, the Botswana government is left with few options for independent development. The extent to which the exploitation of her natural resources is controlled by the country itself is of course another crucial matter. An examination of the structure of the mining industry provides some insights into this matter.

Structure of the mineral industry of Botswana

The mining industry in Botswana is dominated by three giant foreign companies: *AMAX Inc, Anglo American Corporation of South Africa Ltd,* and *De Beers Consolidated Mines Ltd.* De Beers and AAC are virtually the same company. Each owns a controlling share in the other. These international corporations, primarily South African based, virtually control the production of Botswana's three key minerals, diamonds, copper-nickel matte and coal.

Each commodity will be dealt with separately below. Before that, however, it is necessary to outline in some detail the mining policy of Botswana and particularly how the government of Botswana views the role of foreign companies in this very vital sector of the national economy.

Mineral policy

No specific document has been prepared on the mineral policy of the government. The document closest to a formal statement on the government's mineral policy and supporting strategy, is the chapter on mineral development in the National Development Plan. According to C J Johnson there are five different aspects to be considered in the Botswana mining policy:[4]

- Mineral rights vested in the government.

All mineral reconnaissance, prospecting and mining operations are controlled by the Mines and Minerals Act, which stipulates that all rights of ownership of minerals are vested in the State.

In 1967, mineral rights on tribal lands were transfered to the government, with the exception of common building materials. However, in the Tribal Territories this stipulation may be modified by the provisions of the Mineral Rights in Tribal Territories Act.

Large areas with important mineral potentials, were held in private hands. The transfer of these rights to the government was expedited after the enactment in 1972 of a substantial tax on privately held mineral rights.

- The role of the private sector

The private sector is assigned a major role in the exploration and development of the country's mineral resources. To date, the government has been far more successful in making large multinationals follow its guidelines and policies, than small local companies. Government involvement and monitoring of private sector activities includes: equity and board participation; regulation through its Mines and Geological Survey Departments; and the use of specialized consultants.

- Mineral exploration

A very efficient concessional system, combined with a policy of releasing geological information to potential investors, are the major tools for encouraging prospecting. In Botswana there are three types of concessions: *reconnaissance permit, prospecting license and mining lease.*

A reconnaisance permit can be issued to any individual or company. Such a

permit can last for a maximum period of one year and it is offered free of charge. The only obligation to the government is that a report on the activities should be filed within three months after the expiry period. Possession of a permit does not, however, guarantee a prospecting licence.

A prospecting licence covers an area of 1 000 km^2 or less and can initially be issued for a period of three years. Thereafter it is renewable twice for a period of up to two years every time. An application must contain a satisfactory work programme, including a financial commitment. Holding of a licence does not automatically give a right to obtain a mining lease. But, a prospecting licence is a pre-requisite for obtaining a mining lease.

Application for a Mining Lease is made to the Minister of Mineral Resources and Water Affairs, through the Mining Commissioner. A Mining Lease is subject to specific terms that are the outcome of negotiations between the parties. Its initial validity is for 25 years, but may be extended for another 25 years.

• Negotiation and administration of mineral agreements

Generally speaking, government attitude towards private investors is that they shall earn a reasonable return on their investment. However, what shall be regarded as a reasonable returns has never been quantified. The government feels that this must be determined on a project-by-project basis.

Other fiscal measures commonly applied are:

Royalty on sales revenue, which is defined as the gross marketable value of the mineral or mineral products less any costs incurred for the transport of output prior to disposal, for insurance and other costs. Rates for different minerals usually vary between 3 and 10 per cent. In some cases they may be even higher.

Free government equity. The government normally demands a part of the equity, varying from 15 per cent up to 50 per cent. Application of a normal income tax, rates are around 35 per cent.

A *withholding tax* of 15 per cent on repatriated profits can also be levied.

Following negotiations between the parties, a tailor-made package is agreed upon. According to C J Johnson, the government enters such negotiations well-prepared and with a clear conception of the viability of each project.

> "Government analysis includes an estimation of the internal rate of return to the investor in both current and constant terms and also estimates the government's net present value of revenues for different fiscal regimes. Because of differences in the discount rate between government and the investor, it has been possible to vary depreciation and government paid equity to a project in order to increase both the government's net present value and the company's internal rate of return to produce agreements that might not otherwise have been achieved"[5]

• Government control of infrastructure

The most sensitive issue concerns the additional costs involved for building up supporting infrastructural facilities. Companies have been resistant to pick up non-mine related infrastructure costs, even when the overall impact on the internal rate of return on their investment has been minimal.

Diamond mining

The only mining company producing diamonds in Botswana is *De Beers*

Table 1

The Gross Domestic Product of Botswana, 1976/77—1983/84 (M BWP)

Sector	76/77	77/78	78/79	79/80	80/81	81/82	82/83	83/84
Agriculture	74.4	71.7	81.7	83.3	90.5	87.8	74.1	80.1
Mining	42	55.8	117.4	210.7	203.7	129.5	286.4	403.1
Manufacturing	25.3	24.4	42.8	29.2	49.3	71.2	78.7	85.4
General government	52.3	58.6	78.5	92.6	124.1	144.1	171.4	198.4
Trade	55.5	71.9	102.4	157	175	182.4	225.3	289.4
Other sectors	65.6	77.9	93.3	128.7	136.6	164.2	188.4	212.6
GDP at market prices	**315.1**	**360.3**	**516.1**	**701.5**	**779.2**	**779.2**	**1 024.3**	**1 269.0**

Source:
Central Statistics Office

Classifying rough gems at the Central Selling Organisation (CSO), in London.

has a capacity of 3.0 million ct, and its actual output accounts for about one third of Botswana's production. The other two combined have a capacity of 4.8 million ct and accounts for about two thirds of total production in the country. The three mines have been a key factor in the recent economic growth of Botswana. The future prospects of the country will continue to be intimately tied to diamond production.

The history of diamond mining in Botswana starts when the first significant diamond discovery was made by De Beers Prospecting (Pty) Ltd in 1967, near a cattle post called *Orapa*. DEBSWANA was formed in 1969 to develop these deposits. The mine was initially designed to produce 2.5 million carats a year and went into production in 1971.

Table 2

Gross Capital Formation by type of economic activity 1979/80—1983/84 (M BWP in current prices)

	1979/80	1980/81	1981/82	1982/83	1983/84
Agriculture	16.4	13.5	6.1	-20.0	-13.6
Mining	121.9	121.4	107.2	57.2	23.6
Manufacturing	22.3	20.5	18.8	12.7	18.7
Water & electricity	8.2	17.6	22.2	53.8	2.4
Construction	7.2	12.7	1.4	9.0	5.8
Trade, hotels	22	20.1	42.3	25.3	18.8
Transport	7.2	8.8	19.0	14.2	20.8
Bank, insurance	20.5	34.1	28.9	26.0	54.0
Government	78.6	90.1	101.3	123.4	127.5
Social & personal services	6.6	6.0	2.6	2.8	4.3
GCF	**290.9**	**344.8**	**349.8**	**304.4**	**262.3**

Source:
Central Statistics Office

Table 3

Botswana exports, 1980—1984 (M BWP)

Product	**1980**	**1981**	**1982**	**1983**	**1984**
Meat	28.3	63.3	84	80.3	70.2
Animals	0.1	0.1	0.2	0.2	0.2
Hides	3.1	4.8	7.5	5.7	12.7
Diamonds	237.7	141.1	257.1	471	697.1
Copper/Nickel matte	81	83.4	68.2	66.8	77
Textiles	15.7	16.8	28.9	33.5	45.6
Other goods	25.6	38.4	48.2	49.8	66.3
Total exports	**391.4**	**347.8**	**494.2**	**707.4**	**969.1**

Source:
Central Statistics Office

Continued exploration revealed two further payable, but smaller pipes, at *Letlhakane* in the vicinity of Orapa. The partners in the company entered into negotiations for the exploitation of these pipes and also for an expansion of the Orapa plant. In 1973 De Beers geologists discovered the *Jwaneng* pipe.

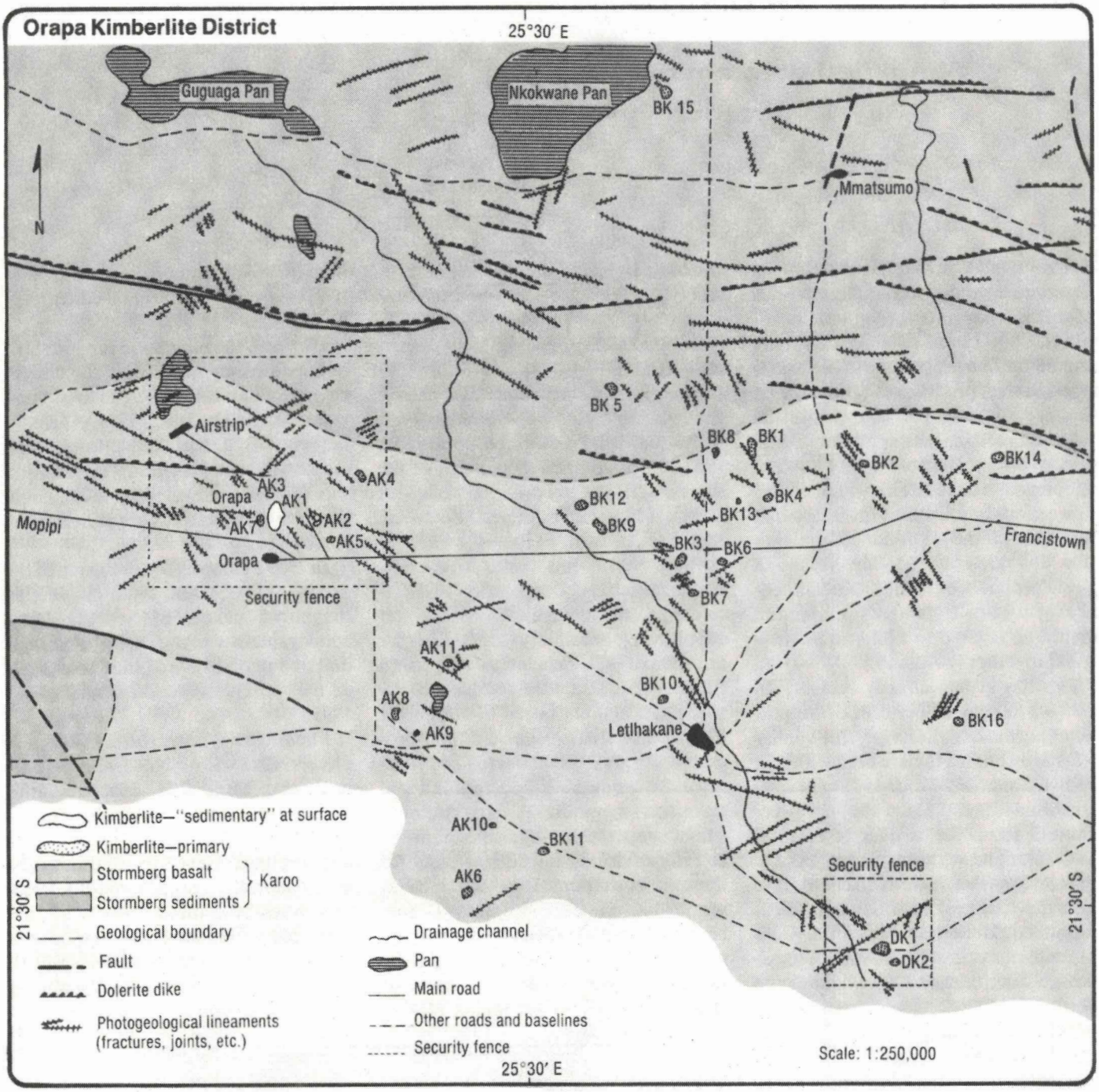
The government increased its shareholding in DEBSWANA from 15 to 50 per cent in 1975, when preparations for expanding Orapa and opening up production at Letlhakane started. In 1976 negotiations were opened up between De Beers and the Botswana government on Iwaneng. The negotiations were protacted and reflected the governments belief that the original mining agreement should be altered as Orapa had proved more profitable than originally foreseen. Details of the new agreement have not been disclosed, but the net effect is estimated to have raised the governments take, through income tax, royalties and dividends, from 50 to 70 per cent.[6]

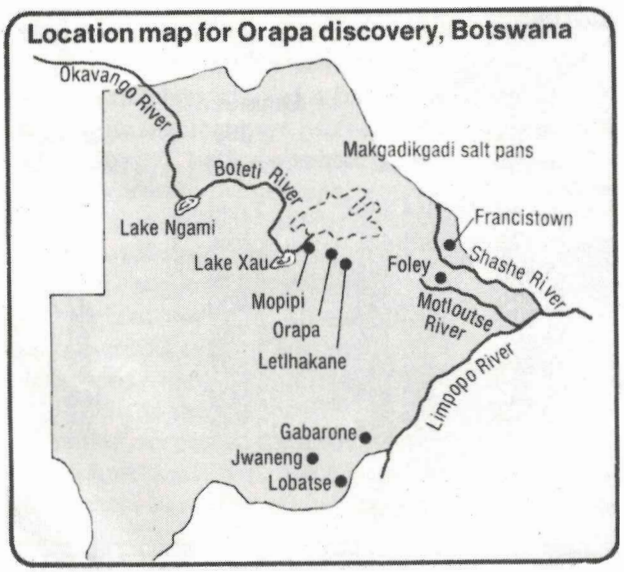
Letlhakane Stage 1 started production in 1977 and Stage 2 in 1980. The Orapa expansion was completed in 1979. Commercial production at Jwaneng started in 1982.[7]

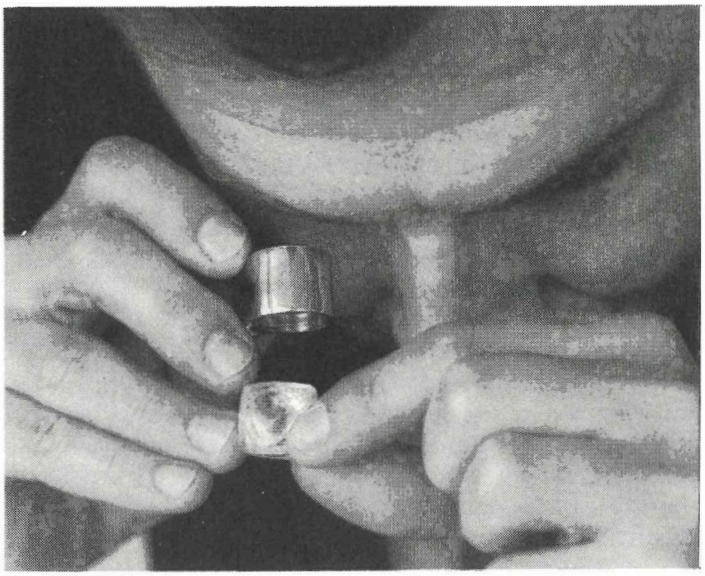
Table 3 below shows the development of mineral production in the country.

Due to Jwaneng, not only does Botswana's overall output exceed that of South Africa in volume, but it also contains a higher proportion of gem diamonds. Only 20 per cent of Jwaneng's output is estimated to be industrial, compared to 50 per cent of Orapa's output. In 1985 DEBSWANA's output exceeded the combined production from De Beers' South African mines, and in this year produced 9.7 million carats. Consequently, DEBSWANA plays a significant role for De Beers' group mines, as it contributes about 55 per cent of group total output.[8]

The marketing of diamonds internationally has, as is well known, been the prerogative of De Beers *Central Selling Organisation* (CSO). During the latter


Orapa Kimberlite District
25°30′ E
Guguaga Pan
Nkokwane Pan
BK 15
Mmatsumo
N
Airstrip
BK 5
BK8
BK1
BK2
BK14
AK3
AK4
Orapa
AK1
BK12
BK4
AK7
AK2
BK9
BK13
Mopipi
AK5
BK3
BK6
Francistown
Orapa
Security fence
BK7
AK11
BK10
AK8
BK16
AK9
Letlhakane
AK10
BK11
AK6
Security fence
DK1
DK2
21°30′ S
Kimberlite—"sedimentary" at surface
Kimberlite—primary
Stormberg basalt
Stormberg sediments
Karoo
Geological boundary
Fault
Dolerite dike
Photogeological lineaments (fractures, joints, etc.)
Drainage channel
Pan
Main road
Other roads and baselines
Security fence
Scale: 1:250,000
25°30′ E


Location map for Orapa discovery, Botswana
Okavango River
Makgadikgadi salt pans
Boteti River
Francistown
Lake Ngami
Lake Xau
Foley
Shashe River
Mopipi
Orapa
Motloutse River
Letlhakane
Limpopo River
Gabarone
Jwaneng
Lobatse



part of 1980, CSO stored some of its diamonds in order to counteract price falls. Prices has since then gradually improved, but as other producers have entered the market (Argyle in Australia) or expanded production (Diamang in Angola) for example, and while the behaviour of USSR sales are unpredictable, one might expect a very modest price increase at best. This will of course have serious implications for Botswana, particulary if the US dollar continues to fall. The greatest risk for Botswana would probably be if the CSO demanded that part of Botswana's production should be stocked to avoid an international oversupply situation.[9]

This has in fact already occured. In 1983—84 about 20 per cent of output, including most of the larger, fine quality gems, is estimated to have been withheld from the market. From 1985 onwards, Botswana is estimated to have accounted for about a quarter of total CSO sales and with the recovery in the diamond market, 1985 is likely to have been the first year in which almost all output could be sold under the CSO quota system. But DEBSWANA most probably continues to have a stockpile worth 500 M USD.[10]

Since 1974 preliminary sorting of diamonds has been carried out in Gaborone by the Botswana Diamond Valuing Co, a DEBSWANA subsidiary, before the stones are channelled via the CSO to the international market. The stones are flown via Kimberley to London for marketing by the Diamond Trading Company. The government has also taken steps to establish direct marketing of polished stones, on a small scale, to diamond trading centres. mabrodium NV, a Belgian diamond cutting firm, was given permission by the government to establish a diamond cutting operation in Gaborone in 1979. In November 1982, Orapa House, Botswana's new diamond sorting headquarters was opened in Gaborone. This means that a local capacity for sorting and valuing diamonds has been established.[11] In practice, however, the marketing monopoly held by the CSO is *really* not threatened.

Copper/nickel deposits were discovered in 1966 at Selebi and Phikwe by *Bamangwato Concessions Ltd (BCL).* This company is a subsidiary of Botswana RST Ltd (incorporated in 1967) which controls 85 per cent of the shares, with the Botswana government having a 15 per cent interest. Botswana RST Ltd, in turn, is jointly owned by AMAX Nickel Inc, based in the US, Anglo American Corporation and different private concerns.

Following feasibility studies in the late 1960s, BCL decided to establish a full mine/mill smelter complex at the site. Shaft sinking began in November 1970. Three shafts were sunk and production from Phikwe started in February 1974, using both underground and open pit methods. A concentrator/smelting operation was also established at Phikwe. Initial investment costs for the project amounted to 192 M BWP, where 142 M BWP originated from commercial sources (partly share capital and partly borrowing from the *Industrial Development Corporation* (IDC) of South Africa and a consortium of West German banks) and 50 M BWP from the government of Botswana.

However, the mine soon ran into operating problems and the initially designed production capacity of 45 kt annually was not reached until 1977. As a consequence, BCL was unable to repay its massive debt and interest. The situation was further aggravated by a decline in the price of nickel and copper during the late 1970s.

In 1979 a complex restructuring of the debt took place, and again in 1982, so that only 30 per cent of the debt remained payable as senior debt. This was deferred until 1985 and then rescheduled over a 10-year period from 1986 to 1995.[12]

The financial restructuring that took place in 1982 was designed with the purpose of keeping BCL debt free until 1986. At this time the combined effect of low metal prices, high interest rates and foreign currency losses due to the pula's depreciation had created a situation where the mine actually should have been shut down, if commercial grounds alone would have been applied. However, with 5 000 workers the mine is one of the country's largest employers

Table 4

Mineral Production, 1978—1985
(in t)

	Total matte	Copper content	Nickel content	Coal	Diamonds (1000 carats)	Index (1984=100)
1978	39 516	14 614	16 049	314 486	2 646	25
1979	39 824	14 563	16 173	355 421	4 269	36.7
1980	40 098	15 554	15 442	371 495	5 146	43
1981	46 566	17 815	18 279	379 924	4 960	42.6
1982	45 679	18 375	17 763	413 778	7 562	61.1
1983	48 087	20 266	18 214	395 087	10 897	85.2
1984	51 846	21 517	18 562	392 854	12 904	100
1985	50 275	21 703	19 560	437 088	12 608	97.7

Source:
Department of Mines

and a continuation of operations was regarded as necessary. An Agreement and Plan of Reorganization was entered into, effective from 1981-12-31, between BCL, the government, the principal shareholders and holder of BCL senior debt (39.2 M BWP). The agreement contained a restructuring of loans from shareholders and lenders, outstanding loans amounted to 130.7 M BWP in 1981, so that only 30 per cent of these amounts remained as fixed obligations of BCL, constituting senior debt. The remaining 70 per cent of senior debt retained the same interest as the original debt and was to be repayable over a period up to 1995. This remaining part became subordinated debt of BCL, denominated in USD, determined at the exchange rates prevailing on 1981-12-21 and amounting to 102.8 M USD. After a deferral period (1982—1985), payments on subordinated debt were to be made only if, and to the extent there was an excess cash after meeting senior debt and other current obligations of BCL, including royalties then due to the government. Unpaid interest bears a rate of 12 per cent per annum.

This agreement was, however, superceded by a new restructuring agreement effective from 1985-07-31, in order to further ease the burden of existing high debt payment obligations. The parties behind the 1982 agreement had discovered that it would be practically impossible for BCL to meet its debt obligations on the due date and a further restructuring was therefore necessary.

In the new 1985 agreement senior debt repayable to the principal Botswana RST shareholders and lenders was now repayable in 20 equal half-yearly installments commencing 1986-06-30 and at 10 per cent interest per annum. Furthermore, during 1986—87, all senior debt obligations may be deferred until 1995-12-31, if there is insufficient cash available.[13] As part of the restructuring, Anglo American Corp, AMAX and the government agreed to extend the existing emergency funding facility of up to 24 M USD to 1987-12-31 in the ratio 37.5—37.5—25. Finally, the mining lease was amended to increase the royalty due to the government from 3 per cent to 3.41 per cent of the gross metal value in the matte as from 1986. This increase reflects the lower gross metal values per the new sales contracts, as well as an increase in the actual royalty. As with senior debt, all royalty due in 1986—87 may be deferred if there is insufficient cash available.

A major part of the BCL output was contracted for sale to a subsidiary of AMAX Inc, the agreement stipulated up to 54 kt per annum. Both parties also agreed to the sale of BCL matte to third parties of approximately 12 per cent of BCL's production in 1983. During the latter part of 1984 BCL initiated negotiations to replace existing exclusive contract with AMAX (due to expire in 1989). AMAX agreed to an earlier termination, if it received compensation for loss of matte feed to its Port Nickel refinery in Louisiana and no longer had to continue its loan obligation, as a major shareholder, amounting to 38 M USD in 1985. BCL was then to pay AMAX a compensation of 30 M USD over a five year period.[14]

The main new contract is with *Falconbridge International* of Bermuda, a subsidiary of Canada's Falconbridge Ltd, in Canada. BCL will supply 6.5 kt in 1985, 21 kt in 1986 and 42 kt annually from 1987 until the 14-year agreement expires in 1999. The matte will be used at Falconbridge's Kristiansand refinery in Norway. No financial details of the contract has been disclosed, but BCL says the terms "will be an improvement on those of the existing agreement" and should "substantially improve BCL's ability to meet indebtedness to various parties".[15]

A second contract is with Centametall of Zug, Switzerland, an international metals trading company. The contract concerns deliveries of 5 kt of low-sulphur matte in 1985, 10.5 kt from 1986, for a 10 year period. Supplies to Centametall are to be toll refined by *Empress Nickel Mining Company* (ENMC), a wholly-owned subsidiary of *Rio Tinto Zimbabwe* (RTZM), at its Eiffel Flats refinery (RTZM is controlled by Rio Tinto-Zinc which has a 58 per cent stake). ENMC will then be able to recommission Eiffel Flats, which was placed on a care and maintenance basis, following the closure of the Empress nickel mine during 1982.

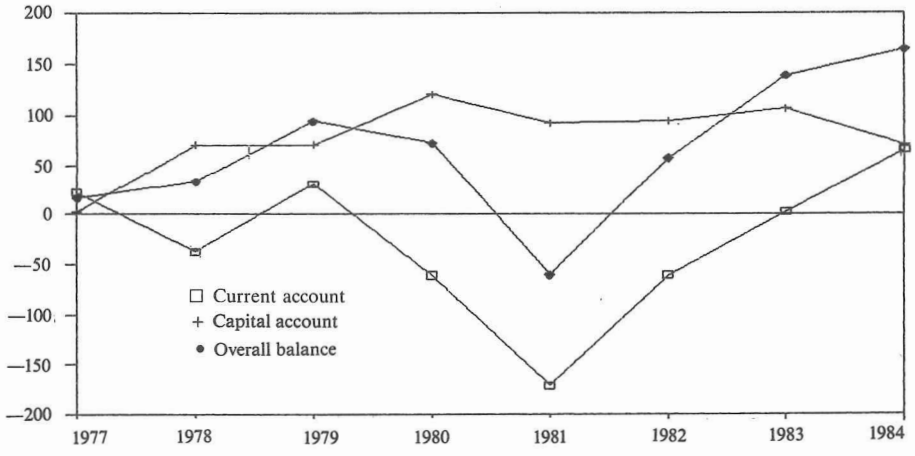
This arrangement has been discussed in Zimbabwe as it is suspected of containing a device for transfering RTZM profits out of the country. Conclusive evidence is, not surprisingly, not at hand. First of all, it has been difficult to establish if there are any corporate linkages between RTZM and Centametall. However, we can presume that the ore owned by Centametall is refined at a price which is 20 per cent lower at Eiffel than corresponding costs at Falconbridge's Kristiansand refinery. Presuming further, that transport costs from BCL to Eiffel to port is to be borne by Eiffel. If RTZM and Centametall are in any way related, then these arrangements would indicate a transfer price arrangements which locates RTZM profits to Switzerland instead of Zimbabwe.

With a production target of 54 kt for 1985, BCL will still have matte to dispose of in 1985 and 1986. An estimated production of 14.5 kt and 21 kt will be unaccounted for in 1985 and 1986 respectively. However, part of this gap will be filled by an 18-month contract with Rustenburg Refiners of South Africa, which is to take 6 kt in 1985 and 12 kt in 1986.

However, notwithstanding these arrangements, the decline of copper and nickel prices during the latter half of 1985 had a very serious impact on BCL cash flow. The company nevertheless recorded a substantially improved operating profit in 1985 of 45.7 M BWP, compared to only 400 000 BWP in 1984, while after interest paid of 1.9 M BWP and realized exchange losses of 10.4 M BWP, there remained a profit of 26.2 M

Fig 1

Balance of payments, 1977—1984



BWP, compared to a loss of 16.6 M BWP the previous year.[16]

After allowing for deferred royalty of P6.5 million, deferred interest of 144.8 M BWP and unrealized exchange losses of 197.9 M BWP, the net loss attributable to Botswana RST shareholders in 1985 increased to 386.4 M BWP, from 226.8 M BWP in 1984. Furthermore, the company also had to pay a compensation to AMAX of 63.4 M BWP in connection with the termination of its matte purchase agreement. The final result was an accumulated deficit of 992.6 M BWP in 1985.

Therefore, in view of the very substantial debt burden and accumulated losses "it is not envisaged that the company will ever be in a position to pay a dividend" according to the Botswana RST chairman, Mr M B Bayliss.

Coal

Exploration was carried out in the Morupule and Mnambula areas by the Geological Survey of Botswana between 1952 and 1962 and detailed proving of the Morupule coalfield in 1972. The Morupule Colliery, 93 per cent owned by the Anglo-American Corporation, accounts for 100 per cent of Botswana's coal production. The coal is classified as steam coal. Minerable reserves amount to 14 Mt and output is being expanded in stages to a target of 480 kt/year, to meet the requirements of the new 990 Mw Morupule thermal power station. The colliery presently supplies the Gaborone and Selebi-Phikwe thermal power stations and the Orapa/Letlhakane diamond mines.

Apart from world market prospects, the cost of providing additional transport facilities is the main constraint for developing a new coal mining capacity. The construction of a new large coal mine is dependent on the building of a railway line from eastern Botswana across the Kalahari desert and Namibia to Walvis Bay.[17]

CONCLUSION

Botswana's economic record during the late 1970s and the 80s has been impressive indeed, compared with most of its illfortuned African brother countries. The country is one of the very few in Africa which allow IMF officials to rest peacefully at night.

This record, however, is not without inherent conflicts. The very loopsided growth process, generated by the mining industry in general and the diamond mines in particular, has created a very unbalanced economic structure. The mining industry has most probably had very few positive influences on the development of other economic sectors, except perhaps the public sector.

It is, however, also a fact that the rapid development of the mining industry has deepened Botswana's dependence on the Republic of South Africa. A dependence which even before was substantial through the membership in the South African Customs Union and the presence of Botswana migrant labour in the mines of South Africa.

Today, South African mining capital controls the production and marketing of diamonds and it exercises a considerable influence on Botswana's copper-nickel production as well. If the mining sector is further developed it is quite likely that not only will South African based mining companies increase their presence in the country, but that use of South African infrastructural facilities will increase as well.

Thus, one may safely conclude that Botswana's continued economic progress is completely linked to an extensive development of its mineral resources. This in turn will deepen its present structural feature of a mineral economy with its built-in unbalanced character. Furthermore, continued reliance on mineral exploitation will increase its dependence on South Africa in general and South African mining capital in particular. This process will place important question marks with respect to the role of Botswana in the movement for the political and economic liberation of Southern Africa from the devastating influence of the apartheid regime in Pretoria.

Notes:

[1] Africa Now, March 1986.

[2] Total number of private/parastatal/government employment was in 1979 75 600 and in 1984 110 000.

[3] The Economist Intelligence Unit, Botswana Country Profile 1986—1987, p 11.

[4] Johnson, C J, "Minerals Objectives, Policies and Strategies in Botswana — Analysis and Lessons", Natural Resources Forum 5, (1981), p 353.

[5] Johnson, C J, 1981:353.

[6] Economist Intelligence Unit, Botswana Country Profile, 1986—1987, p 20.

[7] The Economist Intelligence Unit, Botswana Country Profile, 1986—1987, p 20.

[8] Mining Annual Review, 1986, p 394.

[9] Odén, B, Botswanas makroekonomiska situation, p 18, SIDA, Stockholm 1982.

[10] Mining Annual Review, 1986, p 394.

[11] British Geological Survey, Mineral Brief No 21, 1983, p 9.

[12] British Geological Survey, Mineral Brief No 21, 1983, p 6.

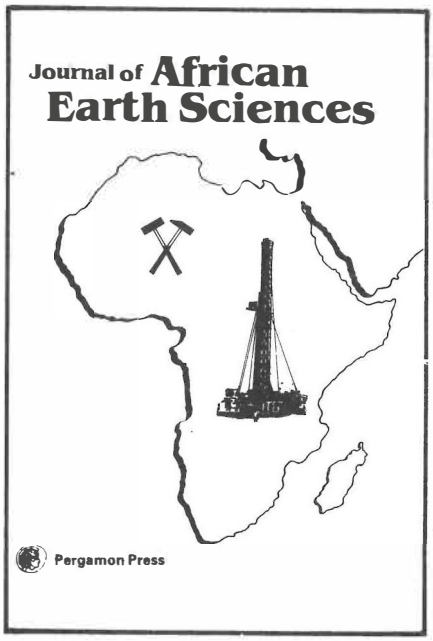
[13] Mining Annual Review 1986, p 395.

[14] Economist Intelligence Unit, Botswana Country Profile, 1986—87, p 21.

[15] Mining Annual Review 1985, p 417.

[16] Botswana RST, Annual Report 1985.

[17] Mineral Brief No 21, 1983, p 11—12; Mining Annual Review, 1985, p 418. ■



JOURNAL OF AFRICAN EARTH SCIENCES

Editorial Board: C A KOGBE (editor-in-chief), *Rock View International, CEEI-Rock View, 1-5 rue Gutenberg, 75015 Paris, France,* R BLACK, *Université de Pierre et Marie Curie — Paris VI, Laboratoire de Petrologie, 4 Place Jussieu - Tour 25,-3 etage, 75230 Paris Cedex 05, France,* R REYMENT, *University of Uppsala, Paleontologiska Inst., Postadress Box 558, S-751 22 Uppsala, Sweden,* and J J W ROGERS, *Dept. of Geology, University of North Carolina at Chapel Hill, NC 27514, USA*

The *Journal of African Earth Sciences* is an international interdisciplinary journal devoted to all aspects of research related to the African continent. Papers incorporating the results of research on regional geology of the African cratons and mobile belts, economic geology, geophysics, structure, Quaternary geology and analysis of sedimentary basins are featured.

Submission of papers for publication are welcomed. Contributors should send three copies of completed manuscripts to the Editor-in-Chief or any of the editors.

In addition the journal includes book reviews, short notes and selected papers from the proceedings of conferences, symposia and workshops on any aspect of African geology and related subjects.

Subscription Information
Published 7 times per annum (Volumes 6)

Annual subscription (1987)	**DM400.00**
Two-year rate (1987/88)	**DM760.00**

A selection of papers

Micropaleontology and biostatigraphy of the coastal basins of West Africa, C A KOGBE & K'ME'HES.
Uranium favourability study in Nigeria, I O OSHIN & M A RAHAMAN.
Felsic plutonic rocks and associated mineralization of the kingdom of Souadi-Arabia, A R DRYSDALL *et al.*
On mineral transformation during laterite formation in Sierra Leone, West Africa, T C DAVIES.
Geophysical investigation of an upper tertiary sub-basin in the Southern Egyptian Red Sea shelf and its bearing on oil operation, M M KHATTAB.
Buried troughs, grabens and rifts in Sudan, R B SALAMA.
La Lithostratigraphie des grandes zones structurales des Mauritanides, (Sénégal orientale, et Mauritanie) Essai d'interprétation géodynamique, A Le PAGE.
Geophysical investigation of deep-seated oil bearing structures in the central part of the African continent, L ZBORIL *et al.*
Geochemical exploration for Sn, Nb, Be, Mo and Bi mineralization, Homr area, South Eastern Desert, Egypt, M M SOLIMAN.
Contributions to the hydrogeochemistry of the area to the immidiate North of Nairobi, conservation area, Kenya, J W MANA & S J GACIRI.

FREE SAMPLE COPIES AVAILABLE ON REQUEST
Advertising rate card available on request. Back issues and current subscriptions are also available in microform.
Prices are subject to change without notice. The Deutsche Mark prices shown are definitive and include postage and insurance. Please enquire for equivalent prices in other currencies.

Pergamon

Headington Hill Hall, Oxford OX3 0BW, UK
Fairview Park, Elmsford, New York 10523, USA

8B/22/7/65