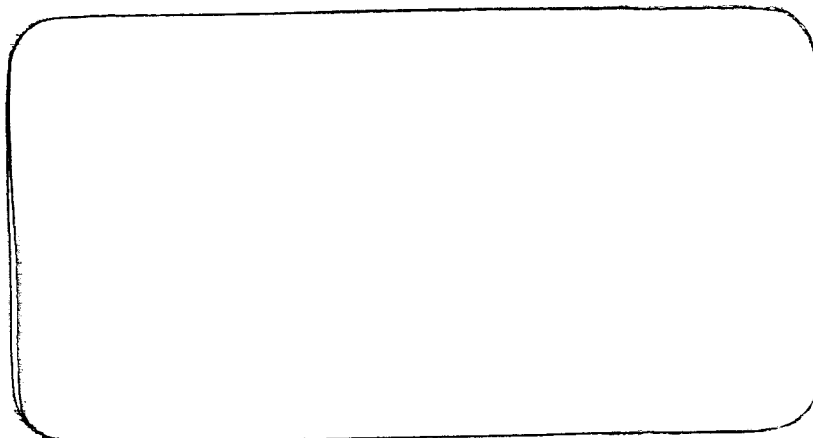




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REPORT ON ADVISORY/LIAISON VISIT TO

MALAWI, SWAZILAND AND BOTSWANA

BY MR I.G. HUGHES

February/March 1982

Report No: 82/8

Report on a Visit to Malawi, 27 February - 5 March 1982

I.G. Hughes, Head, Overseas Division
Institute of Geological Sciences

Diary

- 27 February: arrived Blantyre; met by Dr R.L. Johnson, Chief Geologist, and driven to Zomba.
- 2 March: at Zomba; discussions with Chief Geologist, Assistant Chief Geologist and Assistant Chief Geologist (supernumerary). Job Appraisal Reviews with Mr P.N. Mosley and Mr D.A. Piper, seconded IGS geologists.
- 3 March: at Zomba: public holiday (Martyrs Day): meeting with Mr J Chilton, Mr D Grey and Miss A Smith-Carrington, seconded to the Ministry of Lands, Valuation and Water.
- 4 March: Zomba to Lilongwe by road; meetings in Lilongwe with the Principal Secretary, Ministry of Forestry and Natural Resources and with the Engineer-in-Chief and the Chief Water Resources Officer, Ministry of Lands, Valuation and Water. Evening: buffet supper party at the British High Commissioner's residence.
- 5 March: Lilongwe: 0900, meeting with Mr A.T. Wilson, Head, SADD and Mr J.W. Hodges, Engineering Adviser, SADD; 0930 meeting with H.E. Mr W Peters, followed by discussions with Mr P.J. Sullivan, Deputy High Commissioner and Mr David Smith, Aid Secretary; 11.30, meeting at the British Council with Mr Lee, Deputy Representative; 1400, returned to Zomba.
- 6 March: Zomba - Blantyre - Johannesburg.

2. Geological Survey Department

- 2.1 The professional establishment of the Department is 5 super-scale and 7 professional officer grade posts and of these 5 are filled by Malawian geologists and 4 by expatriates. The latter are all on secondment from IGS: they are the Chief Geologist, Dr R.L. Johnson, the Assistant Chief Geologist, Dr M.J. Crow and two Geologists, Messrs P.N. Mosley and D.P. Piper.
- 2.2 The post of Assistant Chief Geologist is to be localised at the beginning of May 1982 on Dr Crow's departure. He is to be succeeded by Mr J.C. Chatupa and the intention is that on the conclusion of Dr Johnson's tour in September 1983, Mr Chatupa will then become Chief Geologist. There should be no problem in filling the Assistant Chief Geologist post at that time as there are two or three other suitably qualified Malawian geologists already in the Department. Mr Chatupa should prove an excellent Chief Geologist: the programme of localising the Department's senior posts has been satisfactory in every way and the Malawi Government is to be congratulated on its thoroughly sensible and realistic attitude to the problem.
- 2.3 With the departure of Dr Crow after 8 years' service in Malawi, there will be 4 vacancies in the Department's establishment of professional officers and the earliest any of these can be filled is in mid-1983 when two Malawians are expected to return from the U.K. with degrees in Geology. Two other Malawians are reading Geology in the U.K. and they are expected to return in 1984.
- 2.4 The posts of Senior Chemist and Chemist are vacant at present but a Chemistry graduate from Chancellor College is expected to be appointed to the junior post within the next few months. The senior post will probably remain vacant for the time being as it is considered that there is at present an insufficient workload for two chemists.
- 2.5 Support to the Geological Survey Department under OSAS will, on Dr Crow's departure be at the level of 3 posts until September 1983 and thereafter at the level of 2 until late 1983 when Messrs Mosley and Piper complete their tours. I was informed that the Malawi Government would like this level of support to be continued beyond 1983: I pointed out that there would be two Malawian graduates probably returning in mid-1984 but apparently, in addition to its permanent establishment the Department has an allocation of 3 Development posts which are at present unfilled. The Malawi Government will, I was told, press for the continuation beyond 1983 of OSAS support to the Geological Survey at the next Manpower Review and I will return to this question later in this report.
- 2.6 The Department's main activities are concerned with economic investigations with emphasis on industrial minerals. The secondment of Messrs Mosley and Piper was designed for the purpose of assisting with the evaluation of industrial minerals such as brick and ceramic clays, glass sands and limestone for cement and as lime used in the sugar industry, and programmes devoted to these studies are progressing remarkably well. Support for these investigations is being afforded by UNIDO (brick-making and ceramics) while it is also possible that the West German Development Bank (KFW) will fund a ceramics feasibility

study when data covering quantities and quality becomes available.

- 2.7 Three million glass bottles are imported into Malawi every year and as the country possesses all the raw materials required for glass manufacture, plans are underway for setting up such a facility in Lilongwe. The intention is to interest the private sector in the enterprise - the total investment required is likely to be of the order of 6 million Kwacha - but there are problems regarding machinery which is nowadays designed for a minimum production far in excess of Malawi's total annual requirement. There is however the possibility that refurbished second-hand equipment with a much lower production level can be purchased.
- 2.8 The energy crisis continues to affect Malawi's economy to a serious extent and no early alleviation consequent on internal developments are foreseen at present. A feasibility study for Press Holdings by British Mining Consultants of Malawi's two small coalfields has indicated the possibility of a small-scale operation, with a relatively low capital cost, based on the mixing of Ngana and Livingstonia coal. Further data regarding the latter coalfield is however, required and mapping is to be started this dry season.
- 2.9 Much interest is currently being shown in the oil and gas potential of the sediments underlying Lake Malawi and the Shire Valley to the South. The presence of post-Basement sediments and therefore possibly favourable for accumulations of oil and/or gas, although long suspected, was only recently confirmed as the result of studies by an American university party. Royal Dutch Shell have since taken up an option on the area and are to fund a 10,000 line Km aeromagnetic survey. Further work will depend on a consideration of the aeromagnetic survey results but too much optimism would be misplaced as the areal extent of the possible oil/gas bearing rocks is relatively small.
- 2.10 Interest in Malawi's uranium possibilities has waned and the potential ground is at present free of options. The Italian company AGID dis-entangled itself by including in its bid for prospecting rights, conditions it knew would not be acceptable to the Malawi Government and the Japanese decided apparently, to concentrate their efforts on their concessions in Zambia. The U.K.'s CEEGB did not pursue their interest in Malawi's possibilities owing, so it was said, to lack of suitable experienced personnel to undertake fieldwork: I have drawn the CEEGB's attention to the fact that the opportunity for involvement in Malawi is still available.
- 2.11 As an aid to identifying possible sub-surface mineral deposits - it is probable that most of the country's mineral occurrences which crop out at the surface have already been discovered - a major aerial geo-physical survey has been negotiated with the UNDP. This project's costs will be met from Malawi's IPF over the 1982-1986 period and these are estimated to amount to US\$4.2 million. Owing to commitments already entered into only minor sums will be available from the 1982 and 1983 IPFs for the project during these two years and this means that flying cannot take place until 1984 and 1985 which is unfortunate. Built in to the project is the provision of a UN expert to perform the

role of Commissioner of Mines, a function at present exercised by the Principal Secretary, Ministry of Forestry and Natural Resources, and another mining engineer plus the usual provision for visiting consultants and fellowships.

- 2.12 Development of the Kangankunde strontianite by Lonrho and vermiculite deposits by British Gypsum is at a standstill with both companies apparently advancing the excuse of exorbitant transport costs as the reason for the lack of progress. The Metal Mining Agency of Japan however, appears to have more initiative and has agreed to spend half-a-million Kwacha per year for 3 years in an evaluation of rare earth minerals required for Japanese industry.
- 2.13 In my discussions with the Chief Geologist, I was asked whether ODA assistance would be available to enable the following to be undertaken:
- (a) a seismic survey of the Lake Malawi shore - to supplement the ship-borne survey carried out by the American university noted in paragraph 2.9 above - there may be a concealed coalfield north of Karonga;
 - (b) the provision of the services of a geologist experienced in field-mapping techniques to train the newly-returned Malawian graduates. The present complement of geologists, trained in Canada, have not had training in, or acquired experience of, geological mapping and so would be unable to teach the new entrants to the department. The training would be on a short-term basis with up to three months being spent mapping during the field-season and followed by a month's instruction at headquarters in map preparation, etc. Two newly graduated geologists are expected back in mid 1983 as was mentioned in paragraph 2.3 above, so that the earliest the training could start would be September 1983 or thereabouts. A further assignment would be desirable in 1984 on the return of the last two graduates;
 - (c) the establishment of a small lapidary (stone and mineral cutting and polishing) workshop in the Geological Survey for the preparation of items such as ashtrays, lamp-holders, pen stands, etc from local rocks and minerals such as marble, sodalite, agate, black granite, etc. The items prepared would be for sale and it would also be hoped that the project would inspire cottage-type industries in other parts of the country;
 - (d) a training visit to the U.K. by two senior Malawian geologists to prepare them for interfacing with oil company activities that may follow from the impending Lake Malawi investigation. A stay of 1 month would be sufficient to enable visits to the Department of Energy and to the Continental Shelf Division of IGS so as to acquire first-hand information regarding licensing and the subsequent monitoring and control of oil company prospecting and development work; and
 - (e) the attendance of a Malawian geologist at the next Overseas Division IGS Photogeology and Remote Sensing course.

At my pre-tour briefing in ODA I was told of the situation regarding TC funding and I accordingly informed the Chief Geologist that items (a) and (c) above would almost certainly be rejected (particularly as the oil company concerned might be expected to look after item (a)). Item (d) I felt was a most sensible proposal and depending on the views of the High Commissioner and SADD, I would put it to ODA on my return. I promised to do the same in respect of item (b), which I also believe to have merit for funding in the 1983-84 and 1984-85 financial years and with regard to item (e) we agreed to discuss the funding aspect with the British Council in Lilongwe.

3. Ministry of Forestry and Natural Resources

- 3.1 Dr Johnson, Chief Geologist and Mr Chatupa, Assistant Chief Geologist designate accompanied me to the Ministry of Forestry and Natural Resources where we were received by Dr Lipato, Secretary, Mr Jumbe, Deputy Secretary and Mr Mathoto, Under Secretary. After the normal courtesies I reviewed the ODA assistance to the Geological Survey Department and mentioned the satisfactory progress of the localisation programme. Dr Lipato expressed his Ministry's satisfaction at this and said that he hoped that it would be possible for two Professional Officer grade posts (at present held by Messrs. Mosley and Piper) to continue to be supplemented beyond 1983. This would be put to the Manpower Review in due course.
- 3.2 The requests for assistance listed in paragraph 2.13 above were brought up by Dr Lipato and I responded as I had previously done to the Chief Geologist.

4. Department of Lands, Valuation and Water

- 4.1 Three IGS hydrogeologists, Messrs Chilton (Team-leader) and Grey and Miss Smith-Carrington, are on secondment under TC arrangements to the above Department and they met me at Zomba on the 3 March for a general discussion on the progress of their work. There is no doubt that this is a most successful programme which is already proving of very considerable benefit to rural Malawi whose results can in all probability be applied in other countries in Africa with similar climate and geology.
- 4.2 Problems such as lack of funds for map-printing and for research into the effectiveness of subsurface horizontal wells were discussed and it was noted that approaches to ODA for additional money had or are being made. These are items which are well worthy of support and I recommend that every effort be made to provide the additional funds required. (It is appreciated that the project already costs a relatively large sum of money and it should be recorded that the provision of funding for the secondment of a third hydrogeologist has been of the greatest value to the programme).
- 4.3 Considerable concern was expressed by the Team-leader regarding the programme of work after the team's departure from Malawi at the end of this year. The Hydrogeology section of the Department will then be headed by Mr Mainala who is due to complete a post-graduate course this autumn and he will be the only professionally qualified officer in the unit. (There is another and more senior Malawian hydrogeologist but

but he has been under interdiction for more than a year and may well be dismissed from the service). With Mr Mainala's lack of practical experience and considering the heavy work-load including a substantial financial responsibility, there is every cause for concern and ideally either Mr Chilton or Mr Grey should continue to serve as an adviser in the section for a further two year period.

4.4 In Lilongwe I met Mr Farrant, Engineer-in-Chief and Mr Edwards, Chief Water Resources Officer, Department of Lands, Valuation and Water. Both Mr Farrant and Mr Edwards were fulsome in their praise of the work carried out by the hydrogeological team and they underlined the concern felt regarding the programme's work once the team departs. Mr Farrant expressed the hope that either Mr Chilton or Mr Grey would return and drew attention to the spin-off to U.K. industry that results from such an appointment, e.g. the purchase of British equipment and supplies considerable quantities of which are needed in water-supply programmes. I promised to bring these observations to ODA's attention.

5. Southern Africa Development Division

5.1 In company with Dr Johnson, Chief Geologist, I called on Mr Wilson, Head, SADD and Mr Hodges, Engineering Adviser on the morning of the 5 March. I reviewed the points covered in my discussions with the Chief Geologist and with his Ministry and Mr Wilson indicated his support for the mapping training proposal (paragraph 2.13(b)) and for the training visit noted in paragraph 2.13(d) above.

5.2 Mr Hodges informed me that he had had a discussion with Messrs Chilton and Grey regarding continued support to the Groundwater Project and I described my discussion on the previous afternoon with Messrs Farrant and Edwards of the Department of Lands, Valuation and Water. The justification for such continued support was recognised as being indisputable and we also recognised the difficulty of funding from the 1983-84 TC allocation.

5.3 Mr Wilson informed me of his views regarding the desirability of having at least some TCOs organised on a regional basis and not being entirely country specific. From this had stemmed the proposal that Mr Grey should undertake a brief visit to Zimbabwe to acquaint the authority responsible for rural water supplies in that country of the developments brought about by the Groundwater Project in Malawi. That visit had not at that time taken place owing to a problem in obtaining Malawi Government clearance, but the idea of regionally organised TCOs sounds very attractive in these days of high travelling costs.

6. British High Commission

6.1 I was received by H.E. Mr W Peters in his office following my visit to SADD; Dr Johnson, Chief Geologist was also present.

6.2 We reviewed the very considerable assistance rendered under the U.K. aid programme, to the Malawi Geological Survey Department since 1968 and we recognised the success of the localisation timetable. We also

noted the success of the Groundwater Project in the Department of Lands, Valuation and Water.

- 6.3 The approaches for further assistance, itemised in paragraph 2.13 above, were brought to Mr Peters' attention. He indicated his support for the mapping training proposal and he also saw merit in the petroleum study tour suggestion: Dr Johnson should therefore initiate official Malawi Government requests through his Ministry and the Ministry of Economic Planning and Training (MEPT) as soon as possible.
- 6.4 With regard to the lapidiary proposal Mr Peters felt that an approach by the Malawi Government to the EDF might be a possibility though it was probably so inexpensive as to be beneath their threshold. I suggested that the CFTC might, in that case, be prepared to look at the proposal and this idea will be pursued when an estimate of the likely cost has been arrived at.
- 6.5 Mr Peters observed, with regard to photogeological training, that this would be up to the MEPT to decide within their allocation for U.K. training and it was for Dr Johnson to put his case.
- 6.6 I later took the opportunity of informing the Deputy High Commission and Mr David Smith of my discussions with the Malawian authorities and obtained their concurrence in principle with the views I have expressed in the final section of paragraph 2.13 above. The Deputy High Commissioner expressed some reservations regarding the proposal for continued support to the Department of Lands, Valuation and Water on the grounds that this need should have been foreseen at the outset and plans made accordingly. The delinquency of the senior Malawian hydro-geologist could not however, have been anticipated and it is true to say that the success of the Groundwater Project has been such that it has expanded much beyond the original concept.

7. Acknowledgements

- 7.1 My thanks are due to Dr Johnson for the excellent arrangements made for my visit and for his and Mrs Johnson's warm hospitality. I am also very grateful for the kind hospitality provided by the High Commissioner and Mrs Peters. For pre-visit briefing I wish to thank Mrs Janette Wyeth of ODA.

I.G. Hughes
10 May 1982

Report on a Visit to Swaziland, 7 - 9 March 1982

I.G. Hughes, Head, Overseas Division
Institute of Geological Sciences

1. Diary

- 7 March: arrived Manzini Airport: met by Prince Khuzulwandle and Mr M.C. McKeown of the Geological Survey and Mines Department.
- 8 March: Commonwealth Day and Public Holiday: discussions with Mr McKeown, Dr Barton and Mr Prewett in the morning. In the afternoon examined drill cores from the coal-drilling operations in the Low Veldt. Evening, dinner with Mr and Mrs McKeown.
- 9 March: 0900 hours: meeting with H.E. Mr Desmond Kerr, British High Commissioner and Mr David Gordon-Macleod.
1045 hours: meeting with Prince Khuzulwandle, Assistant Director, Geological Survey and Mines Department.
1300 hours: lunch with British High Commissioner and Mrs Kerr. Prince Khuzulwandle and Mr Gordon-Macleod also present.
1430 - 1730 hours: discussions with OSAS officers at the Geological Survey and Mines Department.
1930 hours: dinner hosted by Prince Khuzulwandle at the Swazi Inn Hotel.
- 10 March: 0800 hours: departed Mbabane for Manzini Airport.

2. Acknowledgements I should like to thank Prince Khuzulwandle for the excellent arrangements made by his Department for my brief visit to Swaziland and for the generous hospitality extended to me. Mr McKeown and Dr Barton were also most helpful and their hospitality is gratefully acknowledged. The kind hospitality extended by Mr and Mrs Kerr was much appreciated.

3. Meeting at the British High Commission

- 3.1 My first business meeting was with His Excellency Mr Desmond Kerr and Mr David Gordon-Macleod at the BHC on the 9 March. I mentioned that Mr Allen Dlamini, Director, Geological Survey and Mines Department, was out of the country but that I had chanced to meet him at Heathrow Airport on the evening of the 26 February and that we had had a brief discussion before he embarked on a flight for New York. My discussions at the Department would therefore be with Prince Khuzulwandle, Assistant Director who had, according to the Director, been fully briefed to talk to me.
- 3.2 I informed the High Commissioner that I had confirmed to Mr Dlamini that the two officers seconded from IGS would be completing their assignments in Swaziland within the next few months. Dr Barton should have left the country in February but a request for an extension of his tour until the end of May had been made (this request however, had not at that time been formally agreed to), while Mr McKeown was due to leave at the end of April. Mr Dlamini had however, made a plea for Mr McKeown to remain at post for a further 6 months to assist with considerations for the establishment of a ferro-chrome facility. (That facility would use Swazi coal and iron-ore and chrome ore which it was proposed should come from Zimbabwe.) This proposal was highly confidential according to Mr Dlamini but the Assistant Director would discuss it further with me.
- 3.3 We recognised that the cessation of supplementation for the two Geologist posts in the Geological Survey and Mines Department was in accordance with the last Manpower Review with whose findings I had indicated my agreement in previous reports on my visits to Swaziland. The British High Commission had for some time felt strongly that Mr McKeown should be withdrawn from the country and this was now feasible since a competent Swazi geologist, Mr Maphanga, is ready to take over the running of the Coal Unit. However, Mr Maphanga is not as yet experienced in business negotiations of the type that Mr McKeown has been involved in over the years regarding proposals for the development of Swaziland's coal deposits and in the discussions concerning the ferro-chrome proposal this would be disadvantageous. I said that I was of course, aware that a formal request for the extension of Mr McKeown's tour would have to be submitted to the High Commission by the Swazi Government and I would point this out to the Acting Director; Mr Kerr however, expressed some scepticism regarding the ferro-chrome idea.
- 3.4 The question of Dr Barton's tour extension was discussed: Mr Gordon-Macleod confirmed that a belated request had been received but the justification was not clearly stated and further information had been asked for. I said I would follow this up in my discussions at the Department later that day.
- 3.5 The circumstances surrounding the departure of Mr L Bills, Government Mining Engineer were reviewed and Mr Kerr asked me to find out whether a request for a replacement would be forthcoming. I said that the Crown Agents had already submitted a candidate for the Inspector of Mines vacancy - a Mr Wormald - but no information regarding the status of the submission was available in London.

- 3.6 The recent arrival of Mr W.G. Prewett to fill the Chemist vacancy was noted. It was also noted that a Swazi chemist, Mr Reuben Hlophe was reading a MSc. course in Inorganic Chemistry at Bristol University and that he would complete this course in September. I suggested that Mr Hlophe might receive some practice training in the IGS laboratories before his return to Swaziland and Mr Kerr agreed with this. Mr Hlophe will thereafter work alongside Mr Prewett until the end of the latter's tour.
- 3.7 I asked the High Commissioner whether there was a possibility that some essential items of equipment could be provided for the Department's chemical laboratory - I had spoken to Mr Prewett the previous day and he had expressed serious concern over the age and condition of the instrumentation in the laboratory. I thought that something of the order of £10,000 should be sufficient and Mr Kerr said that this could probably be accommodated within the aid framework: Mr Prewett should therefore prepare a list of the items required.
- 3.8 The fourth OSAS officer at the Department, Mr F Stocks, the Drilling Superintendent had recently (14 November 1981) started his second and final tour. Discussions had been underway regarding the provision of a drilling rig for the Department: I said that I was glad that no final decision had been arrived at as I felt that it would be much more sensible for the Department's water-well drilling requirements to be met by contractors. The inefficiency of the Department's drilling personnel has been described at length on many previous occasions and the problems of maintenance and spare parts are ones that never seem capable of resolution: there may be an improvement during Mr Stocks' tenure of office, but there is no reason to believe that this is anything but temporary. Better therefore let the drilling be done on contract and perhaps provide, under Capital Aid, the pumps for the successful boreholes.
- 3.9 Mr Gordon-Macleod mentioned the question of training and said that the Swazi Government intended to submit 6 applications in respect of Geological Survey and Mines Department nominations. I said that I would discuss this with the Acting Director later that day.
- 3.10 I gave the High Commissioner an account, according to the information I had gathered the previous day in discussions with Mr McKeown and Dr Barton, of activities on the minerals front in Swaziland. The situation appeared to be much the same as on my previous visits extending back for some 10 years, i.e. no development has taken place! In fact there has been a distinct downturn as Shell Coal has decided not to proceed with the development of a mine at Mhlume and the situation at Mpaka is giving grounds for concern as the company is unable to ship more than 8,000 tons a month owing to congestion at Maputo. Mpaka's production amounts to about 18,000 tons a month so that some 10,000 tons have to be stockpiled at the mine each month: the revenue loss is being balanced by a bank loan for the time being. The Area 3 concession is still held by de Vega and he was scheduled to submit his plans for developing the deposits in April: it is understood that 16 boreholes have been drilled in the evaluation programme. Inter-Coal Trading remain in possession of the Maloma

anthracite prospect: it now appears that the company has fulfilled all its licence obligations and it may apply for a Mining Lease sometime. The Japanese company, Sumitomo, is providing some 3 million US dollars for a drilling programme (11,000 metres drilled so far) to evaluate the deeper coal seams under the Low Veldt and it is possible that this work will be extended beyond the original limits agreed with the Government. Future mine developments will probably hinge on the implementation of the Komatipoort rail link: Mr Kerr was of the opinion that it will be 3 to 4 years before there is any progress on that front. The Dokolwayo diamond prospect is still the subject of disagreement between De Beers and the Swazi Government but fresh talks were believed to be scheduled for later on in the month.

4. Discussions at the Geological Survey and Mines Department

- 4.1 Contrary to expectations the Acting Director, Prince Khuzulwandle, did not raise the matter of an extension of Mr McKeown's tour and I did not therefore mention the matter though I did point out that his tour would finish at the end of April. We discussed Dr Barton's situation; the Acting Director had not been informed of the BHC's request for further data, vide paragraph 3.4 above, but a copy of the BHC letter was eventually obtained from his Ministry and he promised to reply forthwith. I am satisfied, following my discussions with the Acting Director and Dr Barton that an extension until the end of May is fully justified and will be in everyone's interest.
- 4.2 The Acting Director confirmed that an indent for a Government Mining Engineer would be submitted to the BHC and I promised to keep an eye out for a suitable candidate. The Director, Mr Dlamini had told me at our Heathrow meeting, something of the circumstances surrounding Mr Bills' sudden relinquishment of his post and the Acting Director mentioned that he had left Mbabane without handing over the keys of his house and without meeting some of his debts. This is out of character and if true, does not redound to Mr Bills' credit.
- 4.3 I enquired as to the position regarding Mr Wormald the Crown Agents' nomination for the Inspector of Mines vacancy. Prince Khuzulwandle replied that Mr Wormald had a child or children of secondary school age and was only prepared to accept the post if he could be guaranteed a place or places at Waterford School. He was in correspondence with that school at that juncture: it appeared unlikely that he would be prepared to travel to Swaziland until June at the earliest even if the schooling problem was resolved.
- 4.4 I drew the Acting Director's attention to the fact that the Drilling Superintendent was now on his last tour and that it was not intended that the post be supplemented thereafter. What therefore, were the Department's plans for localising the post? The Acting Director replied that an understudy, Mr Bembe, had been working with the drilling unit for the last 3 years and was now in the U.K. on a 6 months' training course: he would therefore be taking over from Mr Stock at the end of the latter's tour.

- 4.5 With regard to training requirements, the Acting Director said that they had submitted applications for two awards to start this year, one in mining engineering and one in geology. I said that I thought that with the number already reading Geology in the U.K. (and there may well be others at universities in other countries) the market for geologists would be over-saturated, and that it might be better to train more mining engineers. Prince Khuzulwandle replied that taking into account possible failures and the loss to the private and quasi-government sectors (and also possibly to neighbouring countries) they did not think too many geologists were being trained. He agreed with the point about mining engineers but the difficulty was the identification of persons with mathematics and physics qualifications for such training. The figure of 6 awards mentioned to me at the BHC is, in view of the above, difficult to understand unless it includes those awards already under way and/or those proposed for 1983 and 1984. Unfortunately the opportunity did not occur for me to discuss this matter further with Mr Gordon-Macleod.
- 4.6 In addition to the Director and Assistant Director posts the Department has an establishment of 6 Geologist posts of which 4 are encumbered by Messrs Maphanga, Maphalala, Strachan and Mokogong. A fifth geologist, Mr Nkambule is due to return from the U.K. this summer, a Mr Kanye in 1984 and a Mr Ngwenya in 1985 while a Mr Makagula is studying mining engineering. (The two posts filled by Mr McKeown and Dr Barton are apparently classed as TC and therefore supernumerary). In addition there is an Hydrogeologist, Mr Vilakasi and a Geophysicist, an Ugandan.
- 4.7 The Acting Director did not mention the proposal that a drilling rig be supplied by ODA but he did volunteer the information that CIDA are funding a drilling programme to identify sources of underground water in the Low Veldt. I was unable in the time available, to find out the extent of this programme or whether the drills being used will become the property of the Swazi Government when the work is completed. This point should not be overlooked if further consideration is to be devoted to the question of ODA providing a rig for the Geological Survey and Mines Department.
- 4.8 I was asked by the Acting Director to ascertain the present position regarding the printing of the 1:250,000 scale geological map of Swaziland whose compilation was completed by Dr A.C. Wilson, formerly seconded to the Geological Survey and Mines Department. Dr Wilson has now left IGS and I will contact the Directorate of Overseas Surveys, ODA about this matter.

5. Staff Matters

- 5.1 Career interviews were held with Mr McKeown and Dr Barton who are to be reposted following the end of the leave to which they will be entitled following their service in Swaziland.
- 5.2 Mr F Stocks, Drilling Superintendent (OSAS contract) in his interview with me mentioned that his present accommodation, a flat, is unsatisfactory and that he hopes a house will be allocated to him fairly soon. He also informed me that he had not so far been paid his OSAS

supplementation for the current tour although he had in fact been at post for nearly 4 months. With regard to his section's work he was fairly satisfied with the present situation though he hoped that a new water-well drilling rig would be provided by ODA. As far as his own job satisfaction was concerned he was very content as in addition to his routine duties he was also responsible for coordinating the coal deep drilling project. In response to a question he said that no agreed position had yet been arrived at with regard to the Water and Sewerage Board which it will be recalled, has a major interest in the provision of water for rural communities in which field the Geological Survey and Mines Department is also involved.

- 5.3 Mr W.G. Prewett, Chemist (OSAS contract) had only recently assumed duty in Swaziland and at the time of my visit was involved in reactivating the laboratory after a period of run-down following the departure of the previous chemist, Mr Sims. A refurbishing of the laboratory was about to commence and this was therefore a good time to consider the question of replacing out-dated and worn-out items of equipment. A small sum of money was available in the departmental estimates for new equipment but Mr Prewett did not consider this anywhere near adequate for a proper up-grading and he therefore enquired whether ODA funds might be available to assist him in his plans. As has been noted in paragraph 3.7 above this possibility has already received the High Commission's blessing.

I.G. Hughes
12 May 1982

Report on a Visit to Botswana, 10 - 17 March 1982

I.G. Hughes, Head, Overseas Division
Institute of Geological Sciences

1. Diary

- Wednesday, 10 March: arrived Gaborone Airport 1430 hours; met by Dr G.C. Clark, Director of Geological Surveys and driven to Lobatse.
- Thursday, 11 March: 0800-1230 hours; discussion with Director and Deputy Director.
1330-1700 hours: Job Appraisal Reviews with Drs Gould and Rathbone and Mr Peart. Discussion with Molopo Farms Project staff.
1930 hours: reception at Dr Clark's house.
- Friday, 12 March: 0730: depart for Gaborone.
0830: meeting with Permanent Secretary, Ministry of Mineral Resources and Water Affairs.
0930: meeting with His Excellency the British High Commissioner.
1130: meeting with Professors Wink and Morel, Geology Department, University of Botswana.
1330: arrive back in Lobatse.
1430-1700: JARs with Drs Mortimer and Aldiss and Mr Buckley.
- Saturday, 13 March: 0730: depart Lobatse for Gaborone.
0850: depart Gaborone by air for Maun.
1105: arrive Maun.
afternoon: reconnaissance flight over Okavango Delta.
- Sunday, 14 March: free day.
- Monday, 15 March: morning: road reconnaissance of area between Maun and Lake Ngami.
afternoon: return flight, Maun-Gaborone.
Gaborone-Lobatse by road.
- Tuesday, 16 March: Lobatse; discussions with OSAS contract officers, Messrs. Butterworth, Hutchins, Sutcliffe, Milner and McEwen and with Dr Lock (local terms). Further discussions with Dr Clark.
- Wednesday, 17 March: a.m. round-up meeting with Director and Deputy Director.
p.m. Lobatse-Gaborone-Johannesburg-U.K.
- Thursday, 18 March: 0610: arrived London Heathrow.

2. Acknowledgements I am grateful to Dr G.C. Clark and Mr C.D.G. Black for the excellent arrangements made for my visit and for the kind hospitality extended to me during my stay in Lobatse.

3. Geological Survey Department

3.1 There are at present 12 OSAS supplemented officers on the staff of the Geological Survey Department and this figure will increase to 13 when Dr R.A. Smith assumes duty as Coal Geologist later this summer. Other aid donors contribute the following to the staff of the Survey:

3 from the West German Government
1 from the Dutch Government

In addition there are 2 U.K. TCOs (Molopo Farms Project), and one each from West Germany and Japan and two Canadians.

3.2 There are at present 4 local geologists filling professional grade posts (and one expatriate on local terms) and 4 further graduates are expected back from Canada in 1983 to be followed by one more in 1984. By the end of 1984 there will therefore be 9 local professional grade officers in post with the probability that earth science graduates from the University in Gaborone will become available in 1985. Pressure is already mounting on the Department to speed up its localisation programme: this programme was apparently described recently as being "abysmally slow" by the Government's localisation committee. The Department should not however, be blamed for the slowness in localising posts and the reasons for this have been gone over on many occasions in the past. The present pressure may result in the early promotion to the PR2 grade of Mr Sekwale, PR3 Hydrogeologist and Messrs Machacha and Modisi PR3 Geologists with the possibility that supernumerary posts will be created to accommodate them pending the departure of the expatriates currently filling the substantive posts.

3.3 An interesting aspect of the Geological Survey's staff structure is the increasing number of persons originating from the Indian sub-continent who now fill posts in the professional or senior technical grades. There is a possibility that it is becoming official policy to encourage such recruitment and there is a steady stream of applicants from such places as Zambia.

3.4 The Canadian organisation CIDA has offered manpower assistance to the Geological Survey Department following its successful programme of aid to the Mines Department. The offer apparently amounts to up to 4 professional grade personnel plus financing for counterpart post-graduate training in Canadian universities. The training aspect of the offer is of course, very attractive but that of personnel is slightly embarrassing as there is only one professional grade (PR) post vacant at present. That vacancy is in the Geophysics Branch which otherwise is completely staffed by OSAS officers and thought is therefore being given to applying the CIDA offer to this sector with a start-up date in 18 to 24 months time.

- 3.5 The West German input to the Department's Hydrogeology Branch is to be maintained at the level of two men until 1985 when the situation will be reviewed. The Dutch Government is also providing an hydrogeologist under its technical aid programme.
- 3.6 The main staffing problem affecting the Department at present is that of drillers: the two expatriates filling the Senior Diamond Driller posts left earlier this year and the Tswana Assistant Driller resigned his post to take up better-paid employment in the private sector. I was asked to check the recruitment position with the Crown Agents on my return and this I have done: interviews are to be held on the 14 May and an IGS officer who previously served in Botswana will act as an assessor.
- 3.7 Mr G McEwen, the Technical Records Officer (OSAS) completes his tour in July 1982 and the supplementation for the post ceases then. There is no suitable local replacement available to take over Mr McEwen's role and the suggestion made that a librarian does so is illustrative of the fact that the duties and responsibilities of such a post in a Geological Survey Department are not properly understood. The title of the post is to some extent responsible for the misunderstanding: a more appropriate name would be "Information Scientist". The Director mentioned the possibility that he might request the transfer of supplementation from one of the Senior Driller posts to the Technical Records Officer post as CIDA may offer a driller as part of the Kalahari Drilling Project package.
- 3.8 Apart from the localisation issue, the main problem facing the Department at present is the question of the future role of its Hydrogeology Section. The Ministry of Water Affairs' Director of Water Affairs based in Gaborone, has pursued an aggressive role and has usurped many of the functions performed by the Geological Survey including hydrogeological investigations and much of the borehole site selection in the rural areas is now carried out by his officers. It is clearly wasteful to have two Government organisations overlapping in the same field and it may well be that the Geological Survey's role will be to expand its research and development function and let the Department of Water Affairs deal with the production aspects. A decision on this point is however, required.
- 3.9 The CIDA funded Kalahari Drilling Project was due to finish at the end of April but there was a distinct possibility that a further \$300,000 would be forthcoming to enable work to continue until the end of August. The team-leader is scheduled to remain in Botswana until the end of the year to compile a report on the work. The project equipment, including a drilling rig, will be handed over to the Geological Survey Department. I understand however, that there might be a further phase of the project to drill at the sites which were not in the first list of priorities.
- 3.10 A West German TC project (one resident TCO supported by short-term visits by a team from Hannover) covers mineral exploration in Ngamiland and in the Kheis area in the south-west Kalahari. The project is due to end in mid 1983.

- 3.11 The Japanese TC copper/chromite investigation project in the Matsitama area continues, the drilling phase being completed at the end of last year. A total of 1800 metres was drilled in the course of the work and it is believed that an offer of a further 12 months' work will be made by the Japanese so that some further drilling may be carried out.
- 3.12 I was given to understand that Sweden had asked the Botswana Government to receive a delegation to discuss the potential for joint projects in the minerals field.
- 3.13 With regard to commercial activity in the minerals field the base metals sector is fairly quiet owing to the prevailing low metal prices. Falconbridge and Shell Minerals are the only active prospectors at present with work proceeding in the Matsitama, Francistown and Pitsane-Molopo areas.
- 3.14 The Selebi-Pikwe mine continues to experience serious difficulties and there is a very real possibility that it may close down. With the current low demand for nickel only some 25% of the mine's production can be sold and the cost of producing the matte is higher than the market price of refined nickel.
- 3.15 The ground in which lie the old Selkirk and Phoenix prospects is now open for the grant of prospecting licences.
- 3.16 A market study of the Suwa Pan soda-ash is being carried out by BP Minerals who have prospecting licences covering the Pan and its environs. I was informed that the Botswana Government had received an enquiry from the South African Government regarding plans for developing the Suwa Pan minerals: apparently there are in South Africa deposits of soda-ash which that Government is considering developing and possibly the enquiry was prompted by concern over over-production should both countries establish mines.
- 3.17 Activity on the coal front is substantial with Shell in the forefront. Shell have already proved 6,000 million tons of steam coal in the Serowe area but of course, the transport problem has not been solved. Another difficulty is the availability of water as the coal must be washed before export: it is estimated that something of the order of 4,500 cubic metres a day will be required. The water problem is foremost in the minds of the other organisations - BP Coal, Amax and Charbonnage de France - engaged on prospecting in the Mmamabula region and various possibilities are under consideration in discussion with the Botswana Government viz:
- (a) a regional assessment of the groundwater potential, the cost to be met mainly from Government sources;
 - (b) the companies individually to undertake their own water prospecting within their licence areas; and
 - (c) a joint, integrated water prospecting programme.

I gathered that (a) is favoured and that the Botswana Government may issue requests to tender fairly soon. A regional assessment of this type would of course, be similar to the ODA/IGS GS10 Underground Water Project recently completed and the Institute would be keen to submit a tender for the work.

- 3.18 Reverting to the work carried out by Shell in the Serowe area, a detailed mine feasibility study is underway and probably also a feasibility study of port facilities. In this context the question of a trans-Kalahari railway looms large: the cost at present day prices has been roughly estimated at \$1.2 billion. Such a railway would of course, be of much wider interest than merely to the coal producers though clearly they would be the major customers.
- 3.19 Despite the current low diamond price there is still considerable prospecting activity in Botswana though De Beers may have contracted its own work in this field. Several new Kimberlite fields have been discovered in the Kalahari with one or two pipes of very large size but these appear, unfortunately to be barren.
- 3.20 Some activity concerned with oil exploration continues and the Esso Group has acquired rights over the deep sedimentary basin in the west Kalahari. The licence is for 3 years and only geophysical work is contemplated in this stage of the investigation. There had however, been some complications in the negotiations with Esso and there could still be a hold-up in this programme.

4. Molopo Farms (TC) Mineral Exploration Project

- 4.1 I reviewed the present situation of the project with Drs Gould (Team-leader) and Rathbone. The contract for the drilling phase has been awarded and work was expected to commence about mid-May. Drilling completion is expected to be in June 1983 and financial provision for this must therefore be available in the 1983-84 financial year.
- 4.2 The need for further visit by IGS geophysicists was discussed and it was agreed that a short visit by a senior geophysicist in April/May would be most desirable so that a joint review of the geological and geophysical data could be made to ensure the choice of the optimum drilling sites. (In the event Dr Rathbone came to the U.K. on compassionate leave before the visit could take place and the opportunity was therefore taken to hold the review here thereby obviating the need for a visit). It was also agreed that a visit of 2-3 months by a geophysicist later in the year was necessary to undertake electrical logging of the boreholes so far drilled, the data obtained to be used in the selection of the deep borehole sites.
- 4.3 Once drilling starts one of the two geologists will have to be on site the whole time and with Dr Gould due to complete his two-year tour of duty on the 23 June, this raises problems. The solution we worked out is that Dr Gould extends his present tour until the middle of next December and then take a short U.K. leave of 3-4 weeks to coincide with the drillers' Christmas break. Dr Rathbone should serve a 2½ years' tour to end in June 1983, which date will more-or-less coincide with the cessation of drilling, and then return for a

12 months' tour after enjoying 3 months' leave. The project should be wound up in September 1984 or thereabouts and Dr Gould's second tour should therefore be of approximately 21 months' duration.

5. Further assistance to the Geological Survey Department

5.1 The main assistance to the Botswana Geological Survey Department continues to be in the strengthening of the department, under OSAS arrangements, through the provision of suitable staff to fill its cadre posts until such time as Botswana scientists become available. It is expected that this support will continue to be required at its present level until 1984 or 1985 but that there would be a gradual decline thereafter.

5.2 The progress being made with the Molopo Farms Project was noted in my discussions with the Director of Geological Survey. I went over with him the proposed leave arrangements for the team outlined in paragraph 4.3 above.

5.3 During my meeting with the Director and the Deputy Director, the case was put to me for the supply by ODA as part of the Capital Aid programme of a drilling rig suitable for attempts at evaluating the underground water resources of the Okavango delta. This proposal, but then part of a much wider hydrogeological study of the delta, has been raised on previous occasions though not proceeded with on the grounds of high cost. In the meantime the Department has been investigating alternate sources of funding for the delta study and there had been indications that the UNDP would be willing to undertake the work. However, news had recently reached Botswana that the UNDP while agreeable in principle to supplying the expert input were unable to meet the cost of the drilling rig required and had suggested that the Government seek funding for this from bilateral sources. The main object of a study of the Okavango delta would be the availability or otherwise of water for piping or channelling to potential consumer centres such as for instance, coalfields in the Serowe/Mmamabule areas. Suggestions have been made that surface water off-take from the delta is feasible and while that may be so for part of the year it certainly was not the case in March of this year, vide paragraph 9.2 below. My own view is that the cost of abstracting water from under the delta and then transporting it to consumption centres would be prohibitive, even if sufficient water is proved but I promised to raise the question of providing a drilling rig with the BHC and with ODA. (It should be recognised that the drilling equipment which will be handed over by CIDA later this year would not be suitable for the type of drilling required in the Okavango).

6. Ministry of Mineral Resources and Water Affairs

6.1 In company with Dr Clark, Director of Geological Survey, I called on Mr Charles Tibone, Permanent Secretary of the Ministry of Mineral Resources and Water Affairs on the 12 March.

6.2 I mentioned to the Permanent Secretary that since my visit a year ago, the posts of Deputy Director and Assistant Director in the

Geological Survey had been filled by officers on secondment from IGS. I also said that one geologist and one hydrogeologist had been seconded to fill PR3 posts and that a coal geologist had been nominated to fill the remaining PR3 Geologist vacancy as Mr Tibone had requested in our discussion last year. The Permanent Secretary expressed his appreciation of this assistance and volunteered the statement that there might be an increase in the number of PR posts in the Department. This latter remark came as somewhat of a surprise to the Director who feels that his Department already possesses an adequate level of professional posts.

6.3 The Molopo Farms Project was briefly discussed and I informed Mr Tibone of the likely timetable concerning drilling and of the proposed visits by IGS geophysicists.

6.4 On each of my previous visits to the Ministry, the question of undergraduate training in the earth sciences has been raised and various proposals have been put forward. The unavailability of suitable candidates for training has however, been the deciding factor and no progress has therefore been possible. On this occasion when the matter was brought up I pointed to the fact that the University of Botswana now offered undergraduate schemes of study in the earth sciences and that there were already several students reading such courses. In view of this I advanced the opinion that it would be best to leave undergraduate training to the University and use some of the ODA training allocation for funding post-graduate courses in specialised branches such as geophysics, geochemistry, etc at British universities. Mr Tibone agreed with this viewpoint.

7. British High Commission

7.1 I was received by His Excellency Mr Wilfred Jones, British High Commissioner following my interview with Mr Tibone; Dr Clark was also present.

7.2 The staffing situation in the Geological Survey Department was described to the High Commissioner and the Molopo Farms Project was discussed.

7.3 I mentioned the question of the supply from aid funds of a drilling rig for the proposed UNDP Okavango Delta study; the High Commissioner said that as far as he understood the situation the Botswana Government had only allocated a Priority 2 rating to the proposal. Furthermore he was highly doubtful that sufficient funds could be made available from the aid framework to enable purchase of the equipment.

7.4 The Suwa Pan development proposal (BP Minerals) was mentioned to the High Commissioner as was the South African interest in the fate of the proposal.

7.5 The High Commissioner drew our attention to the recent visit by an EC delegation which included M. Pisani and Mr Maurice Foley. The delegation, impressed by Botswana's mineral wealth, noted that the recent CIDA aerial magnetic survey left some 20% of the country un-

covered. It therefore appeared as if the EC might be receptive to a request for funding for an aerial geophysical survey of the uncovered sector of Botswana. Dr Clark however pointed out that this is the sector whose geology is already mapped and is fairly well known as it is not covered by Kalahari sediments.

7.6 The High Commissioner also mentioned the proposals deriving from the Nairobi conference on new and renewable sources of energy plans to evaluate energy natural resources both renewable and non-renewable. Consultants were being appointed to draw up the plans and each study might take 2 years to accomplish.

8. Department of Earth Sciences, University of Botswana

8.1 Dr Clark and I paid a brief visit to the University of Botswana where we had a discussion with Professor Wink head of department, and Professor Morel. Professor Wink is sponsored by the Free University of Amsterdam and Professor Morel is British having formerly served for a short while as Principal Geologist in the Botswana Geological Survey.

8.2 The Professors gave an account of the undergraduate curriculum in earth sciences and we discussed various aspects of it such as the proportion of laboratory work and practical geological mapping. The course seems of sensible design and well-suited to meet the needs of a developing country and I saw no reason, following my discussion at the University to detract from the viewpoint I expressed to Mr Tibone earlier vide paragraph 6.4 above.

9. Visit to the Okavango Delta

9.1 The opportunity of a weekend visit to the Okavango Delta was taken in view of the Geological Survey's request for consideration of the supply of a drilling rig for the proposed UNDP study of the underground water resources of the area.

9.2 At the time of my visit surface flow within the delta was minimal and in the main waterways there was only sufficient for the restricted use of locally made canoes. This situation was confirmed during a low-level flight across the delta and the suggestion made elsewhere that a surface off-take of water for use in distant centres of consumption is clearly untenable. If use of Okavango water is to be seriously considered there is no question but that the underground resources must be evaluated. So far boreholes drilled in the vicinity of the delta have not penetrated beyond the superficial Kalahari beds and the potential of any deep-seated aquifer is unknown. The areal extent of any such deep-seated aquifer is of course, another question which would have to be answered.

9.3 The question of developing Okavango water will I feel be a matter of economics: as an academic exercise it would be highly interesting to find out whether deep-seated aquifers exist and possibly their proving could lead to reasonable irrigation in the immediate vicinity of the delta.

10. Staff Matters

10.1 I conducted Job Appraisal Reviews with the IGS seconded officers and career interviews with the OSAS contract officers. I also had discussions with three non-OSAS staff. The salient points that emerged from the above discussions are as follows:

Dr Aldiss: dissatisfaction expressed at the disproportionately low rate of FSA for single seconded officers. He pointed out that the single rate then was £745, the married unaccompanied rate, £2385 and married accompanied £2675. The discrepancy is obvious and he was seeking an explanation.

Mr Peart: pointed out that he will have been 8 $\frac{1}{2}$ years in Botswana when his current tour ends in June 1983. He therefore felt that it would be beneficial from the point of view of his career, to leave Botswana though he would like to continue to work overseas. He was obtaining considerable job satisfaction in Botswana as the Department is very well endowed with modern geophysical equipment.

Mr Butterworth: his contract ends next December and he was undecided as to whether he would request another tour. He had a feeling that he had been in Botswana long enough and perhaps a new challenge should now be looked for. I gained the impression that he may go to South Africa to work. I suspect, though he did not say so, that he was not entirely happy at the way the appointment of Mr Mukhopadhyay, Chemist PR3 had recently been pushed through.

Mr Sutcliffe: his tour ends in March 1983 and he plans to ask for another tour perhaps in the hope that he will be promoted to Principal Chemist if Mr Butterworth does not renew his contract. The arrival of Mr Mukhopadhyay has however, introduced a complication and it could be him that would be promoted as he is equally qualified and has slightly longer experience.

Mr Hutchins: his current tour ends on the 28 May 1982: he has requested a further contract and this request received the Director's support. The proposed CIDA involvement in the Geophysics Branch, of which Mr Hutchins is Head, was noted as was the fact that Mr Tombale, Assistant Geologist had been nominated for a post-graduate MSc course in Applied Geophysics. He mentioned

that equipment to the value of 300,000 Pula had been supplied by the West German Government.

Mr McEwen:

completes his tour on the 21 July 1982 and has applied for an ISTS award from ODA to read the MSc. Information Science course at the City University. He was somewhat unhappy with the situation in the Department as had not been able to train up anyone to take over the full range of responsibilities from him. Unfortunately there is not yet in Botswana a pool of people with the type of background, training and experience from which a suitable replacement might have been found and the indications are that the organisation and machinery established by Mr McEwen, and performing so efficiently, will stagnate once he has left.

Mr Milner:

tour ends in August 1983 and he then plans to go into private practice in the computer/electronics field.

Mr Buckley:

had only been in the Department just over 3 months. Had been pleasantly surprised at the Department's level of efficiency and there had been no difficulty so far in collaborating with the (West German) head of the Hydrogeology Branch. Mr Buckley was however, disappointed at the inadequate water resources records system which bore no comparison with the system set up by the GS10 Underground Water Project (UK TC). He also regretted the absence of opportunities to discuss the Branch's work and I subsequently suggested to the Director that the Branch should hold discussion panels regularly.

Dr Lock:

on local terms though not a Botswana citizen. Sought advice on his career prospects particularly on his chances of joining IGS. I advised him that at the age of 34 and in the light of the present financial climate, it was most unlikely that IGS would be able to offer him a post. I also said that in the light of the renewed pressure on localisation, I did not think that he had much of a prospect in the Botswana Geological Survey either and I suggested he should examine the possibility of joining one of the mining companies working in Botswana or setting up as an independent consultant.

Mr Tombale:

informed me that he had been nominated for the MSc. course in Applied Geophysics at Birmingham University which would be his first choice. If he fails to gain admittance to Birmingham, and

his academic achievements so far may not be acceptable to that University, he will be nominated for a CIDA award. With regard to the requested British Council award, there is a complication in that Mr Tombale was the recipient of an award within the last 3 years to attend the IGS Photogeology and Remote Sensing 3 months' course in the U.K. Mr Tombale would certainly be a good choice for training in geophysics, despite his possibly suspect initial degree which was really no fault of his own, and I recommend that the 3-year rule be relaxed in his case.

Mr Sekwale:

Hydrogeologist: had successfully completed the London University MSc. course in Hydrogeology last October (British Council award) and was complimentary about the course content. It appears likely that he will in the not too distant future head the Hydrogeology Branch in the Department and to my mind he is a horse to back in the race for the post of Director of Geological Survey.

I.G. Hughes
14 May 1982