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Overseas Division
Occasional Reports

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REPORT ON A VISIT TO
MALAWI, KENYA, ETHIOPIA AND EGYPT
24 NOVEMBER - 11 DECEMBER 1978

by

DR A W WOODLAND

and

MR I G HUGHES

Institute of Geological Sciences
154 Clerkenwell Road
London EC1R 5DU

REPORT ON A VISIT TO

MALAWI

24 - 27 NOVEMBER 1978

DR A W WOODLAND, DIRECTOR IGS

AND

MR I G HUGHES, HEAD, AFRICA UNIT

OVERSEAS DIVISION, IGS

- 1 Owing to the closure of Chileka Airport our arrival in Malawi had to be postponed until 24 November and we were therefore restricted to a three-day stay in the country. Government offices are, however, open in Malawi on Saturday mornings and this enabled us to complete the major part of our discussions with the Chief Geologist, Geological Survey Department, and his officers on 25 November. We then travelled by road to Lilongwe, in company with the Chief Geologist, on Sunday, 26 November and the following morning we visited the Ministry of Agriculture and Natural Resources, the British High Commission and the British Council. We left Lilongwe by air that afternoon for Chileka Airport to catch the Nairobi flight.
- 2 Geological Survey Department
 - 2.1 The Chief Geologist is now Dr R L Johnson on secondment from IGS, who replaced Dr J H Beal last May. It appeared to us that Dr Johnson is fitting in well in his post and Mr Peter Brown, Under-Secretary, MANR, confirmed this view when we spoke to him in Lilongwe. Dr Johnson is ably supported by Dr M J Crow, Principal Geologist also on secondment from IGS, who has been in Malawi since 1974. The change of Chief Geologist coincided more or less with the completion of the South African Chamber of Mines mineral assessment project to which most of the Geological Survey's manpower had been committed as counterpart input, and Dr Johnson with the resources now restored to his control is in a position to initiate new lines of investigation. Certain restrictions on the expenditure of funds for travelling and subsistence have, however, proved irksome but nonetheless a three-pronged work programme is being introduced covering the following aspects:
 - (a) Industrial Minerals Project incorporating the identification and evaluation of deposits of clays, sands and gypsum. The clay evaluation sector of this project is to be UN funded;
 - (b) Airborne Geophysical Survey. Only a fifth of Malawi has so far been geophysically surveyed from the air and the remainder is now being covered by a magnetometric and radio-metric survey financed by CIDA;
 - (c) Detailed examination of known mineral occurrences. The

emphasis in this sector is currently on fertilizer minerals and pyrites for sulphuric acid manufacture for use in the wood pulp industry and, to a lesser extent, in making fertilizers.

The Geological Survey is currently drilling the Tundulu carbonatite which is believed to contain between 2 and 3 million tonnes of ore averaging 12% P_2O_5 . So far some 900,000 tonnes of 20% grade ore have been blocked out but neither this quantity nor this grade are adequate for the establishment of a fertilizer plant. Further drilling may disclose additional ore of comparable grade and the problem then will be an ore-dressing one, ie the difficulty of separating phosphate-bearing minerals from the carbonates. This problem has proved insurmountable in the past, but it now appears that the Brazilians have evolved a successful process as their Jacuparanga carbonatite body is being mined for its phosphate content with the carbonate tailings being used for cement-making. A bulk sample of ore from Tundulu is to be submitted to Warren Spring Laboratory for ore-dressing tests.

- 2.1.1 Dr Johnson is also preparing a draft Mining Law for Malawi to replace out-dated legislation. The new law is an amalgam of the mining laws administered in Zambia and Botswana, and Dr Johnson's previous service in the former territory is proving of particular value in this aspect of his responsibilities in Malawi.
- 2.2 Hydrogeology. Mr J H Chilton of IGS's Hydrogeology Unit was undertaking a short-term assignment in Malawi at the time of our visit. His remit is to draw up in consultation with the Chief Geologist and with the advice of Dr E P Wright, Hydrogeological Adviser, IGS, a master plan for evaluating and developing the country's water resources for the benefit of the rural areas. Mr Chilton was due to complete his task by the end of the year and in his report he will be recommending that an hydrogeologist be provided under UK TC arrangements to set up within the Geological Survey Department the organisation necessary for executing the master plan. The hydrogeologist would control the organisation initially but would train a counterpart and hand over direction of the unit to him before the end of the two-year period estimated to be necessary for the TC appointment. The secondment of a member of IGS's Hydrogeology Unit for this assignment is strongly recommended as this will enable close contact with the Hydrogeological Adviser, on whose advice the plan was first envisaged. A starting date of about mid-1979 will be suitable for this assignment.
 - 2.2.1 The Chief Geologist is not in favour of sending further Malawian graduates on MSc courses in Hydrogeology at overseas universities as the two already sent to the UK for such training have failed to return to their homeland on the completion of the courses. His Ministry supports him in this view: it is felt that on-the-job training by the TC Hydrogeologist will satisfy Malawi's needs in this field.
- 2.3 Geophysics: the Geological Survey does not have a geophysicist on its staff (attempts to place a Malawian geologist on a post-graduate Applied Geophysics course in the UK have so far been unsuccessful). The Department possesses a considerable range of geophysical equipment and it had been expected that a geophysicist would have been provided as part of the CIDA programme in Malawi. The appointment has, however, been deferred for probably two years and, in consequence, there have

both some informal exchanges between the Chief Geologist and ODM regarding the possibility of seconding a geophysicist for a two-year tour. The primary need is to train technical officers of the Geological Survey in the use of geophysical methods in prospecting for sub-surface water supplies and an evaluation of geophysical data already in the Department's possession is also required. This latter task would be followed up by detailed fieldwork where this was merited but there could be difficulty regarding funds to meet vehicle running costs. ODM have, however, indicated that such costs could be paid, within limits, from TC funds.

- 2.3.1 The other problem associated with TC appointments concerns housing. There is a serious housing shortage in Zomba and it is not unusual for officers to have to wait for several months before accommodation becomes available. One way of overcoming this difficulty would be for the assignment to be performed on a short-term basis: it was agreed that this might be borne in mind if no other solution presents itself. We discussed these matters at the British High Commission in Lilongwe on 27 November, vide paragraph 4.1.1 below.

3 Ministry of Agriculture and Natural Resources

- 3.1 Mr Peter Brown, Under-Secretary in the Ministry responsible for the Department of Geological Surveys, outlined to us the proposals under consideration for various changes associated with the Department. Increased activity in the minerals field (vide paragraph 6) had highlighted the need for a unit to advise the Government on mining matters and to administer the mining law. It was proposed that Dr Johnson should become Commissioner for Mines, Geology and Water Resources with Dr Crow as his deputy, and that a mining engineer be recruited to fill a new post of Inspector of Mines. Mr Brown admitted that there might not be a full-time job for a mining engineer immediately, and in view of this we suggested that Malawi's needs might be met through a consultancy arrangement for the time being. Developments in the coal and radio-active minerals field are the ones that will require monitoring fairly soon.
- 3.1.1 Mr Brown reviewed the Geological Survey's hydrogeology and geophysics plans and we said that we would recommend to ODM that Malawi's requests for assistance in these fields be accepted. We did, however, mention the difficulty over accommodation for officers on residential assignments and Mr Brown asked whether ODM might be prepared to provide funds for erecting housing for TCOs. We promised to raise the matter with the BHC later that morning.
- 3.1.2 Another point raised by Mr Brown concerned Lake Malawi. Dr Johnson had earlier drawn attention to the lack of knowledge of the subsurface geology of the lake and suggested that it was now time that some light was thrown on this question. (Escapes of gas have been known for many years but one investigator in the 1950's concluded that the gas is methane derived from rotting vegetation.) A full-scale investigation of the lake bed would be extremely expensive and is probably not warranted at the present time, but a reconnaissance sparker survey would provide useful basic data. We therefore suggested that a senior officer from IGS's Continental Shelf Division might pay a short exploratory visit to Malawi for discussions and to advise whether a moderate programme of ship-borne geophysics would be justified.

4 British High Commission

- 4.1 We met Mr Magnus Todd, Engineering Adviser, and Mr Mark Herdman, First Secretary at the BHC. Mr Herdman informed us that at the Manpower Review meeting at the Ministry of Agriculture and Natural Resources, from which he had just returned to his office, a request for the provision of an OSAS post for a Mining Engineer had been made. We said that Mr Brown had raised this matter with us earlier that morning and we mentioned that we had enquired whether there would be a full-time job for him bearing in mind the current level of activity in Malawi. A short-term consultancy might be more effective for the time being.
- 4.1.1 We raised the general question of ODM funds being forthcoming for building accommodation for TCOs in view of the serious housing shortage in Zomba. Mr Herdman said that the possibility of providing such funds could not be ruled out, though in the case of the hydrogeologist (the A1 had not then been received at the BHC) there would not be sufficient time to build a house. The same would apply to the geophysicist should a residential assignment be agreed to; a promise to build a house or houses (or perhaps a small block of flats) could perhaps lead to an earlier release of housing from the "pool" than might otherwise be the case.
- 4.1.2 The possibility of a brief visit by a member of IGS's Continental Shelf Division in connection with Lake Malawi's sub-surface geology was mentioned to Messrs Herdman and Todd.

5 British Council

- 5.1 We paid a call on the British Council office in Lilongwe on 27 November and had a discussion with Mr Chislett, Assistant Representative. Mr Chislett informed us that they had only two requests at that time for training awards in the earth sciences field, one for a 3 months' course in Photogeology at IGS and the other for a post-graduate course in applied geophysics. We informed Mr Chislett that the 1979 Photogeology course will now be held in the autumn, instead of in the spring as in the past, at Keyworth, Nottinghamshire where the Overseas Division of IGS is to be located after June of that year. The other application will be dealt with through the normal procedure whereby one of us (Mr Hughes) acts as the British Council's adviser on post-graduate training for earth scientists.

6 Mineral Developments in Malawi

- 6.1 Rare Earths A mining lease has been awarded to Lonrho to mine the Kangankunde deposit for its strontianite content. Monazite and apatite will also be recovered and the latter, which is a phosphate-bearing mineral, will be stockpiled in the expectation that it can be used in a fertilizer industry in due course. Pilot plant studies on the ore have been completed and the mine plant is to be set up in 1979. We gathered that contracts for the sale of the strontianite and monazite have already been signed.
- 6.2 Vermiculite British Gypsum have applied for a mining lease to exploit the vermiculite but apparently some slight doubt still remains as to whether they will go ahead with development.
- 6.3 Corundum A South African company is negotiating a mining lease covering

the Tantalum corundum deposit (for use as an abrasive). The mineral occurs as a residual in the overburden and mining is planned on a tribute basis.

- 6.4 Fertilizers The Geological Survey's investigations at Tundulu have already been mentioned at paragraph 2.1 (c) above. A further possibility is the Chingalei carbonatite, itself low in phosphates but with some concentration of the phosphate mineral in the overburden. Pitting carried out under the direction of the South African Chamber of Mines team revealed an overall grade of 3.7% phosphate material which is appreciably less than the 5% cut-off figure for this type of operation. It may, however, be possible to delimit areas within the deposit with concentrations approaching 5% thus opening up the possibility of selective small-scale mining.
- 6.5 Pyrite A 35 million ton pyrite deposit containing 8.4% sulphur has been investigated by the Geological Survey. This deposit lies to the north-west of Lilongwe: the main use of the sulphur would be in the manufacture of sulphuric acid for the pulp industry with any surplus being utilised in the fertilizer industry.
- 6.6 Coal President Banda has directed, so we were informed, a company called Press (Holdings) Ltd to commence mining coal from the Ngana field without delay. Press in turn have entered into an arrangement with W C French and Kear, another company registered in Malawi, to decide whether the Ngana operation should be opencast or underground. This problem has already been examined by the South Africans and the Japanese; the former were of the opinion that the cost would be the same, 14 million Kwacha, for both types of operation, producing 90,000 tons a year, but no expense for port facilities and shipping were allowed for. The Japanese, who carried out a pre-feasibility study in 1976, ie two years earlier than the South Africans, gave an estimate of 2.3 million Kwacha for an adit mine which figure did not include provision for pumping or haulage costs, neither was the cost of a washery included. A feasibility study promised by the Japanese has not so far been carried out.
- 6.7 Radioactive Minerals The Italian organisation AGIP are currently negotiating an exclusive prospecting licence covering an area underlain by Karroo sediments in the extreme north of the country. An airborne radiometric survey of the area was carried out on behalf of AGIP by Hunting Geology and Geophysics Ltd, the UK contractors.

REPORT ON A VISIT TO

KENYA

27 NOVEMBER - 6 DECEMBER 1978

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MR I G HUGHES, HEAD, AFRICA UNIT

OVERSEAS DIVISION, IGS

- 1 We arrived in Nairobi late on Monday, 27 November and spent the next day in discussions at the Mines & Geological Department and at the British High Commission. We left the following morning by air for Koobi Fora on the shores of Lake Turkana at the start of our reconnaissance of the proposed geological and mineral survey project area. On Thursday, 30 November we flew from Koobi Fora to Marsabit and from there we continued our journey by road visiting Samburu, then driving across from Samburu to Maralal and from Maralal back to Nairobi on Sunday, 3 December, with a diversion to Olkaria Geothermal Project en route. This reconnaissance enabled us to gain a good impression of the geological and physical framework of the project area, and we have no doubt that the proposal as put forward by the Kenya authorities is most aid-worthy. The brief acquaintanceship with the geological conditions in the area also enabled us to formulate our ideas as to the types of officers needed to man the team.
- 2 On our return to Nairobi we entered into detailed discussions regarding the organisation of the project with the Chief Geologist, Mr J W Wairegi. We gave Mr Wairegi an outline of the work programme and estimates of cost attached as Appendix 1 to the report on the visit by Hughes to Kenya in April/May, and said that we did not feel that any major changes could be foreseen consequent on our visit to the project area. We considered that four years should suffice for the project as there would be problems such as vehicles becoming unserviceable if the period were to be extended much beyond four years. The Chief Geologist accepted this but asked that we should not be too rigid with our timetable in case, for one reason or another, the work could not be completed satisfactorily within the four year period. We agreed that this should be so.
 - 2.1 Mr Wairegi then outlined his plans for the counterpart staff to be attached to the UK team. The Co-Manager would be an experienced geologist from his Department and there would be one other counterpart with three or four years' experience. The remaining two professional counterparts would be newly graduated geologists shortly to be recruited into the Department. He also hoped to take advantage of the project to train field technicians for the Department: this would be on a sandwich

- system with the trainees spending six months of each year in the field and the other six months at the Nairobi Polytechnic undergoing formal course work. We welcomed this as properly trained technicians can relieve professional staff of much routine work such as geochemical sampling, the operation of geophysical equipment, etc.
- 2.2 The Chief Geologist then commented that the project plan which we had outlined to him did not contain any provision for training awards in the UK. He had in mind particularly post-graduate training in Hydrogeology and Applied Geophysics. We said that there should be no great difficulty in arranging such courses through the auspices of the British Council once suitable candidates for training had been identified, and we suggested that we should review this matter at the end of the first year of the project. This suggestion was accepted.
- 2.3 We then enquired whether one of the Department's geologists working under Dr Cannon would be nominated for the 1979 Photogeology course in the UK. On Hughes' previous visit it had been suggested that Mr Frank Karanja should attend the course, but there had been holdups in officially nominating him. The postponement of the course until the autumn would, however, allow enough time for the nomination to be processed and we further suggested that Mr Karanja, who has displayed exceptional promise under Dr Cannon's guidance, should spend two months or so in the summer of 1979 (ie before the start of the Photogeology course) gaining experience with one of IGS's geological mapping parties in the UK. Mr Wairegi welcomed this suggestion.
- 2.4 The hydrogeology component of the project was reviewed and the Chief Geologist noted that there would be no input during the first year of its life. He then reminded us that in the formal request submitted to the BHC on 25 July 1978, it had been proposed that the hydrogeologist should undertake the regional evaluation of the ground mapped as part of the Coastal Geology Project under Dr Cannon's direction. It had been hoped that CIDA would have given assistance here but the Chief Geologist now understood that no funds would be available for this work for at least two years. A drilling rig provided as part of the Austrian technical aid project, Austromineral, would be available towards the end of 1979 for exploratory drilling in the coastal region, and the Kenya Government therefore hoped that the UK team would include an experienced hydrogeologist from the inception of the project and that he would work in the coastal region during the first year. We said that this sounded reasonable but that we would need to give further consideration to the matter particularly the question of the availability of staff. It may be feasible to perform the whole of the hydrogeological work on a short-term basis, the cost then falling on the IGS subvention and not on TC funds.
- 2.5 We then raised the question of drilling equipment for the North Maralal hydrogeological work which Mr Wairegi last May had promised would be supplied from Water Development Department resources. We had earlier had a brief discussion with the Austromineral hydrogeologist who has been working in conjunction with the Water Development Department, and his remarks raised doubts in our minds as to the wisdom of placing any reliance whatsoever on that department's capabilities. The Chief Geologist, however, said that his plan was to have the Austromineral rig available for the North Maralal investigations; the rig was to be

handed over to the Water Development Department on the termination of the Austromineral project but it had been agreed that the Mines & Geology Department should have its use whenever desired. Its first job would be in the coastal region as mentioned above. This may prove to be a satisfactory arrangement and the work in the coastal region will allow the opportunity to evaluate the situation as it develops.

- 2.6 The question of transport for the North Maralal project revealed a divergence of opinion as to the merits of licencing the vehicles as Kenya Government property or as private vehicles or with diplomatic number plates. The activities of the Turkana cattle rustlers and other malcontents are responsible for this state of affairs; on balance we consider that there would be much to be gained by issuing the vehicles with Kenya Government number plates. We, however, impressed on the Chief Geologist that for the duration of the project the vehicles would be strictly under the control of the UK team leader, and that it was essential that he and the other UK experts should be able to drive them notwithstanding the nature of their number plates.
- 2.7 Continuing with the question of vehicles, Mr Wairegi asked that an additional Landrover be supplied for the use of the hydrogeologist should his involvement in the Coastal Geology Project be agreed to. The Chief Geologist also considered that two 7-ton lorries, as allowed for in Hughes' estimates, would prove inadequate. Our view is that the provision of an additional Landrover for the hydrogeologist is reasonable but in the light of Dr E P Wright's report on his visit to Kenya in January 1979, the question of an additional 7-ton lorry can be deferred for the time being.
- 2.8 Before we left the question of project transport we asked the Chief Geologist whether it might be possible for his Ministry to seek priority for the road improvement programme in the area north of Maralal. In the course of our safari we gained the impression that south of the latitude of Maralal, roads and tracks are fairly reasonable but that to the north the tracks are extremely rough with consequent very heavy wear and tear on vehicles. Mr Wairegi said that pressure could be placed on the Ministry of Works and/or on the regional organisations concerned.
- 2.9 We then turned to the matter of the timing of the project. A starting date in July 1979 had been proposed in the A1 but Mr Wairegi now accepted that some delay was inevitable. He was, however, keen that field-work should start in January 1980, i.e. the start of the dry season, and we agreed that this is a desirable time to aim for. We also concurred with Mr Wairegi's view that the team leader should arrive in Nairobi in advance of the main party in order to arrange housing, draw up the work programme, etc so that there should be no inordinate delays when the other geologists and their families arrive. The Chief Geologist suggested that the team leader should arrive in August and the rest of the team in November; we do not think it will prove possible for us to have the team leader in Nairobi before October with the rest of the group following in early December.
- 2.10 Basic grade geologists in the Kenya Mines & Geology Department receive a field allowance of 75 Kenya shillings (about £5.35 sterling) per day, and the Chief Geologist enquired whether the BHC would claw back an equivalent sum from his Ministry for each UK geologist working on the project. We said that our geologists would receive allowances at rates determined by ODM which might not be at the same rates as the ones paid

by the Kenya Government. We agreed that if there was to be a claw-back this would place a severe strain on the Mines & Geology's votes (no compensating provision has been allowed for in the department's votes) and we said that we would recommend to ODM that the full cost of field allowances for the TCOs be met from UK funds.

2.11 The publications resulting from the project's work will be in the form of 1:250,000 geological maps with overlays carrying data concerning hydrogeology, mineral provinces, etc and each map being accompanied by a descriptive bulletin. In Hughes' discussions with Wairegi in May 1978, the Kenyans had asked that UK TC funds be provided to meet the cost of printing the bulletins and maps and a sum of £20,000 was accordingly included in the project estimates. On this occasion, however, the Chief Geologist said that the Kenya Government is prepared to contribute an annual sum of £1,000 for four years starting in July 1981. This in effect would be a continuation of the contribution being made towards the cost of printing the East African Geological Research Unit (Bedford College) maps under ODM Research Scheme R3036. We told Mr Wairegi that we felt sure ODM would be appreciative of this gesture.

2.12 A revised estimate of expenditure for the project, based on February 1979 figures, is attached as Appendix 1. The revision takes into account Dr E P Wright's recommendations covering the hydrogeological aspects of the project, ie provision is only made for the short-term appraisal visit, the cost of which would be debitted to the IGS subvention and not to regional TC funds. There is consequently a reduction from £545,820 to £531,000 in the estimated charge on regional TC funds with an increase from £104,450 to £118,300 in the amount which would be debitted to the subvention.

3 Coordinating Geologist

Mr Wairegi confirmed the request in the A1 asking the UK to supply the services of a suitable geologist to fill this post. He did not, however, think that the expert would be required to take up his duties until the first half of 1981, and it was therefore agreed that the question of transport and equipment for him could be deferred for the time being. Hughes, in paragraphs 3.4 and 3.4.1 of his May 1978 report, has already indicated why this request should be accepted.

4 Coastal Geology Project

The Chief Geologist asked whether it had been agreed that there should be an extension of Dr Cannon's appointment so that the Coastal Geology Project could be completed satisfactorily. He said that the work so far carried out had been most successful and he wished to extend the mapping southwards towards the Tanzanian frontier. The reason for this is that impressive radio-active anomalies have been identified in the sediments of the coastal belt as a result of the CIDA aeromagnetic survey, and detailed mapping will enable the accurate identification of the host rock. The question of an extension of Dr Cannon's appointment is discussed in paragraphs 2.1 to 2.4 of Hughes' report on his

visit to Kenya in April/May 1978, but the extension required is now estimated by the Chief Geologist to be 19 months rather than the 12 months originally thought.

- 4.1 In our view Dr Cannon is performing a most creditable role and this role, initially purely a training one, is now proving of importance in the economic field. We therefore recommend that his services be provided for a further 19 months after the expiry of his leave which he is due to start in April 1979.

5 Meetings at the British High Commission






We reported at the High Commission on 28 November at the request of Mr W J Watts, Acting High Commissioner. Mr Watts sought clarification regarding letters from Dr K Williamson of IGS's Hydrogeology Unit (who is the Institute's authority on geothermal energy matters) suggesting that there might be a role for the UK in any further evaluation of Kenya's geothermal resources. Mr Watts felt that it was now too late in the day for the UK to enter this field in Kenya. Dr Woodland agreed with this in general; the IGS has only a limited capability as far as geothermal resource evaluation is concerned, and in Kenya developments would appear to have proceeded some way beyond that level. Mr Watts informed us that a World Bank team was in Nairobi then to discuss the financing of UNDP proposals for further geothermal evaluation programmes, and he suggested we attempt to contact them to ascertain whether there would be scope for any possible UK involvement.

- 5.1 The correspondence referred to by Mr Watts was initiated following a communication from Mr Grieveson, Engineering Adviser, EADD to the Principal Engineering Adviser in ODM who asked the IGS Hydrogeological Adviser to look into the matter.
- 5.2 On 5 December we again called at the BHC and saw Messrs Robin Crompton and Douglas Whitecross. We gave them an account of our discussion with the Chief Geologist and we drew attention to the various amendments requested by him to the North Maralal project programme. We also raised the matter of an extension of Dr Cannon's appointment and explained that 12 months will be taken up with completing the geological mapping of the Kalifi area and finalising the report and maps, and then 7 months to extend work southwards towards the Tanzania frontier.
- 5.3 With regard to the geothermal situation we said that we had been unable to contact the World Bank team but that we had been to see Mr J W Noble of the EAP&L. Mr Noble had explained to us that no one organisation in Kenya was responsible for grass roots geothermal investigations and certainly EAP&L had no capability in this respect. We had, however, learnt at an earlier stage that the Mines & Geological Department is planning to set up a Geothermal Unit though it is difficult to envisage this being in any way effective for some time to come.













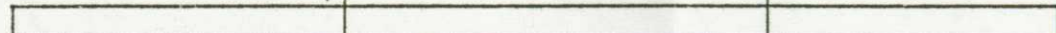



















Acknowledgements

We are most grateful to Dr R T Cannon and Mr J Wachira, Mines & Geological Department for arranging an excellent programme, and we also thank Dr Cannon for his generous hospitality.

KEY

-  Residential work overseas
-  Preparation time - UK
-  Leave
-  Short-term overseas work
-  UK component of short-term project

KENYA

	1979/80					1980/81					1981/82					1982/83					1983/84																			
	A/M	J/J	A/S	O/N	D/J	F/M	A/M	J/J	A/S	O/N	D/J	F/M	A/M	J/J	A/S	O/N	D/J	F/M	A/M	J/J	A/S	O/N	D/J	F/M	A/M	J/J	A/S	O/N	D/J	F/M										
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Hydrogeologist																																								
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KENYA PROJECT:Summary of CostsI Estimated cost to TC Funds

Geological mapping		
4-man team	£376,800	
Equipment (inc freight)	18,800	
Printing maps and Report	20,000	
Vehicles (inc freight)	48,500	
Cartographer	<u>66,900</u>	£531,000

II Estimated cost to ODM/IGS Subvention

(a) Geological mapping	£ 7,550	
(b) Geochronology	19,100	
(c) Geophysics	71,550	
(d) Hydrogeology	<u>20,100</u>	<u>£118,300</u>
		<u>£549,300</u>

KENYA PROJECT - TC FUNDS

RESIDENTIAL STAFF - COSTS ASSUME MARRIED MAN & 2 CHILDREN
(OF BOARDING SCHOOL AGE)
ESTIMATE OF COSTS BASED ON FEBRUARY 1979 FIGURES

	<u>1979/80</u>	<u>1980/81</u>	<u>1981/82</u>	<u>1982/83</u>	<u>1983/84</u>	<u>TOTAL</u>
	£	£	£	£	£	£
<u>GEOLOGISTS</u>						
Av Salary (inc NI)						
1 PSO & 3 SSOs	11,287	29,442	29,442	29,442	29,442	129,055
Superannuation	2,483	6,477	6,477	6,477	6,477	28,391
NERC Overheads	1,088	2,900	2,900	2,900	2,900	12,688
FSA	3,938	10,445	8,476	10,445	8,476	41,780
"Duty Free Compensation"						
Allowance	598	1,560	1,262	1,560	1,262	6,242
Boarding School Allowance	6,256	9,384	9,384	9,384	9,384	43,792
Education Travel	5,336	13,340	10,672	13,340	12,673	55,361
Medical	200	500	500	500	200	1,900
Field Subsistence	2,137	4,275	4,275	4,275	2,133	17,100
Regional Workshops & Seminars	-	1,000	1,000	1,000	1,000	4,000
Air Fares	2,668	-	5,336	-	2,663	10,672
Outfit Grant	700	-	-	-	-	700
Expatriation Allowance	880	-	-	-	-	880
Transfer Grant	3,365	-	-	-	3,365	6,730
UK Travel & Subsistence	800	-	-	-	700	1,500
Freight - baggage & cars	8,000	-	-	-	8,000	16,000
	<u>49,736</u>	<u>79,323</u>	<u>79,724</u>	<u>79,323</u>	<u>88,685</u>	<u>376,791</u>
<u>CARTOGRAPHER</u>						
Av Salary (Higher Grade)	-	4,305	5,166	5,166	5,166	19,803
Superannuation	-	947	1,137	1,137	1,137	4,358
NERC Overheads	-	604	725	725	725	2,779
FSA	-	2,071	2,485	2,071	2,174	8,801
"Duty Free Compensation"						
Allowance	-	263	315	263	276	1,117
BSA	-	1,564	2,346	2,346	2,346	8,602
Education Travel	-	2,668	3,335	2,668	3,335	12,006
Medical	-	125	125	125	125	500
Air Fares	-	667	-	1,334	667	2,668
Outfit Grant	-	175	-	-	-	175
Expatriation Allowance	-	160	-	-	-	160
Transfer Grant	-	805	-	-	805	1,610
UK Travel & Subsistence	-	175	-	-	175	350
Freight - baggage & cars	-	2,000	-	-	2,000	4,000
	<u>-</u>	<u>16,529</u>	<u>15,634</u>	<u>15,835</u>	<u>18,931</u>	<u>66,929</u>
c/fwd	49,736	95,852	95,358	95,158	107,616	443,720

over/

	<u>1979/80</u>	<u>1980/81</u>	<u>1981/82</u>	<u>1982/83</u>	<u>1983/84</u>	<u>TOTAL</u>
	£	£	£	£	£	£
b/fwd	49,736	95,852	95,358	95,158	107,616	443,720
Equipment (list attached)	13,400	1,000	1,000	1,000	1,000	17,400
Air freight field and camp equipment	1,400	-	-	-	-	1,400
Printing maps & Report	-	-	-	-	20,000	20,000
	<u>14,800</u>	<u>1,000</u>	<u>1,000</u>	<u>1,000</u>	<u>21,000</u>	<u>38,800</u>
Vehicles (list attached)	39,975	-	-	-	-	39,975
Sea freight vehicles	8,500	-	-	-	-	8,500
	<u>48,475</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>48,475</u>
GRAND TOTAL TC FUNDS	113,011	96,852	96,358	96,158	128,616	530,995

KENYA PROJECT

Equipment List

Estimate of Costs based on August 1978 figures

VEHICLES

	£
1 Range Rover and extras	7,425
4 Longwheel base 12-seater Land Rovers and extras	21,550
2 Bedford 7-ton lorries	<u>11,000</u>
	<u>39,975</u>

FIELD EQUIPMENT

2 stereoscopes and 2 microscopes	2,000
Telecommunication equipment	2,500
Contingencies	5,000
Spares, maintenance, repair etc. to vehicles, and camp and field equipment	5,500

CAMPING EQUIPMENT

5 refrigerators	400
5 kits camping equipment	1,500
Medical supplies	<u>500</u>
	<u>17,400</u>

KENYA PROJECT
ODM/IGS SUBVENTION FUNDS
ESTIMATE OF COSTS BASED ON FEBRUARY 1979 FIGURES

	<u>1979/80</u>	<u>1980/81</u>	<u>1981/82</u>	<u>1982/83</u>	<u>1983/84</u>	<u>TOTAL</u>
	£	£	£	£	£	£
<u>PREPARATION TIME</u>						
<u>MAPPING TEAM</u>						
1 PSO	3,460	-	-	-	-	3,460
3 SSOs	4,075	-	-	-	-	4,075
	<u>7,535</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>7,535</u>
<u>GEOCHRONOLOGY</u>						
1 SSO - Overseas Visit	-	2,590	-	-	-	2,590
UK Lab. Work	-	-	14,630	-	-	14,630
Air fare	-	667	-	-	-	667
Subsistence	-	980	-	-	-	980
Honorarium	-	240	-	-	-	240
	<u>-</u>	<u>4,477</u>	<u>14,630</u>	<u>-</u>	<u>-</u>	<u>19,107</u>
<u>GEOPHYSICS</u>						
1 PSO - Overseas Visit	-	3,330	5,040	5,040	1,710	15,120
UK	-	-	5,240	5,240	5,240	15,720
1 SSO - Overseas Visit	-	2,600	3,920	3,920	1,320	11,760
UK	-	-	4,075	4,075	4,075	12,225
Air fares	-	1,691	1,091	1,691	-	5,073
Subsistence	-	1,955	2,981	2,981	1,026	8,943
Honorarium	-	600	900	900	300	2,700
	<u>-</u>	<u>10,176</u>	<u>23,847</u>	<u>23,847</u>	<u>13,671</u>	<u>71,541</u>
<u>HYDROGEOLOGY</u>						
1 PSO - Overseas Visit	6,660	3,330	-	-	-	9,990
UK	1,780	3,560	-	-	-	5,340
Air fares & freight	867	-	-	-	-	867
Subsistence	1,955	1,026	-	-	-	2,981
Honorarium	720	180	-	-	-	900
	<u>11,982</u>	<u>8,096</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>20,078</u>
 GRAND TOTAL SUBVENTION FUNDS	 19,517	 22,749	 38,477	 23,847	 13,671	 118,261

REPORT ON A VISIT TO

ETHIOPIA

6 DECEMBER 1978

DR A W WOODLAND, DIRECTOR IGS

AND

MR I G HUGHES, HEAD, AFRICA UNIT

OVERSEAS DIVISION, IGS

- 1 The opportunity was taken of a flight change in Addis Ababa to visit the Institute of Geological Services, Ministry of Mines, Water and Electricity with which department there had been a fairly good relationship prior to the political changes in Ethiopia. An IGS officer, Mr K Holmes, was also, at the time of our visit, advising the Institute on the setting up of a spectrographic laboratory. We were accompanied on our visit to the Institute by Mr John Audy, First Secretary at our Embassy, with whom we had had the benefit of a discussion beforehand.
 - 1.1 At the Institute we were received by Dr Ababew Endeshaw, acting head of the department. He gave us a brief account of the work of the Institute which has a professional staff of about 40 of whom 20 to 25 are fully qualified geologists, and the remainder diploma holders from the local university. A further six or seven geologists were on overseas courses at that time.
 - 1.2 The Institute's fieldwork is concentrated in the Wollega province and other activities are concerned with geothermal investigations in the Rift Valley (in association with UNDP), with hydrogeological work and with industrial mineral surveys. We also understand, though this was not communicated to us by Dr Ababew, that a large party of Russians are working in association with Institute staff in the Adola Goldfield.
 - 1.3 Dr Ababew went on to express his and his Ministry's appreciation of the excellent work performed by British TCOs Drs Walsh and Du Bois. The former vacated his post as Geological Editor at the beginning of December in order to take up the post of Project Manager, UN Project for the Strengthening of the Institute of Geological Sciences. This project has been in existence for many years without a great deal ever having been achieved and it is very much doubted that Dr Walsh, for all his energy, enthusiasm and popularity, will be able to change the situation particularly as the political position is so fraught with difficulties.
 - 1.4 As had been anticipated Dr Ababew made a plea for us to supply a replacement for Dr Walsh as Geological Editor. In reply we pointed

out that a counterpart had been promised for Dr Walsh to train (it may well have been Dr Ababew himself whose name was mentioned to Hughes on a previous visit as the possible counterpart), and we enquired what further work required to be done. Dr Ababew said that Dr Walsh had disposed of the back-log of publications requiring editing and what was now needed was for someone to deal with new material as it came in. We pointed out that it would be most difficult for us to find a suitable replacement for Dr Walsh and we believe that Dr Ababew realised that we were not in any way disposed to help any further in this direction.

- 1.5 We then repaired to the Institute's new laboratory buildings which are some distance from the Ministry compound. Mr Holmes had then been a month in Addis Ababa and therefore had a further 3 months of his assignment to complete. He was experiencing considerable difficulties in his task of setting up the quartz spectrograph, difficulties in no small way due to the fact that the instrument had lain for almost 2 years on the dock-side at Djibouti. Much of Holmes' time had therefore been taken up with attempting to repair the damage to the machine and this had proved most frustrating owing to the almost complete lack in Addis Ababa of even the simplest electrical item. Most of the material required for repairing the spectrograph had therefore been obtained from IGS in London.
- 1.6 It was therefore inevitable that Holmes will not be able to fulfil all the objectives of his assignment within the allotted 4 months. The main shortcoming will be in the training of his counterparts and while he hopes that he will be able to impart sufficient knowledge for the equipment to be operated on a routine basis, there will not be time to coach the operators in non-routine determinations and in coping with breakdowns etc. It is therefore suggested that Mr Holmes returns to Ethiopia in February or March 1980 for two months or so to review progress and to expand the training already given. The cost of the visit would be borne by the ODM subvention to IGS.

2 Acknowledgements

We are most grateful to Mrs V Hewlett for her help during our visit, and we should also like to thank Mr John Audy for his support and for his kind hospitality.

REPORT ON A VISIT TO

EGYPT

7 - 11 DECEMBER 1978

DR A W WOODLAND, DIRECTOR IGS

AND

MR I G HUGHES, HEAD, AFRICA UNIT

OVERSEAS DIVISION, IGS

- 1 The opportunity was taken to call in at Cairo, en route from East Africa to London, to check on the position regarding the proposed Southern Desert geological and mineral survey which it is hoped to get under way in the autumn of 1979. A letter of understanding covering the project had been despatched by ODM to our post in November for consideration by the Egyptians, and it had been hoped that this could have been signed while we were in Cairo.
 - 1.1 We had a preliminary discussion at the British Embassy on 9 December with Mr Nicholas Barrington, Counsellor, and Mr Leslie Hughes, First Secretary (Aid). Messrs Barrington and Hughes then accompanied us to the headquarters of the Geological and Mining Authority where it was expected that Mr Barrington would sign the Letter of Understanding on behalf of the UK Government.
 - 1.2 It, however, soon became clear at the meeting with the Chairman of the Geological Survey and Mining Authority's Board of Directors and his senior officers that he was not prepared to accept the programme of work as outlined in the letter. We had omitted from the proposed programme any mention of work in the area west of longitude 29°E as there are no topographic maps or air photographs of this large stretch of desert available. Mr Moustafa, however, was insistent that there should be a reconnaissance of about 3 weeks' duration of the windows of basement rocks already pinpointed in the area in question. We were not adverse to this but the Chairman then went on to propose that if the reconnaissance disclosed anything of possible economic interest, part of the 1980-81 field-season should be devoted to a more detailed examination of such occurrences.
 - 1.3 We pointed out to the Chairman that as no maps or air photographs of this area are available, follow-up work would be most difficult and time consuming. Mr Moustafa countered by promising to obtain the services of the Egyptian Air Force to undertake air photography of any promising areas and then to have base-maps prepared from the photographs.
 - 1.4 We replied that if we were to agree to a follow-up programme this would have to be on condition that air photographs and topographic maps of a

suitable scale would be made available by the Egyptian Government. But as the Chairman's proposals entailed a not inconsiderable variation of the programme set out in the letter of understanding (with the possibility that the start of the Eastern Desert phase might be delayed), we said that the whole question would have to be referred back to London for consideration.

- 1.5 Mr Moustafa raised two further points which required clarification, viz
 - (a) the provision of £12,500 indicated in the letter of understanding for the counterparts' training attachments in the UK did not appear to be adequate; and
 - (b) would the vehicles to be provided by the UK be handed over to the GS&MA on the conclusion of the project?
- 1.6 With regard to the counterpart training costs, we said that the figures were based on the current British Council allowances for post-graduates on courses in the UK. The allowances are reviewed regularly and are adjusted to keep pace with the cost of living in the UK. We, however, promised that a breakdown of the figure for counterpart training would be provided. (The provision of £12,500 includes an element to meet IGS costs for bench space etc).
- 1.7 The question of what happens to the vehicles at the end of the project would have to be considered in London and this was discussed with Messrs Barnes and Duckering in ODM shortly after our return from Cairo. The Egyptians' concern over this matter is owing to the fact that the department has to pay customs duty on vehicles donated by aid donors, and provision has therefore to be made in their estimates of expenditure for the year in which the handover takes place.
- 1.8 We informed Mr Moustafa that provided the Letter of Understanding suitably amended had by then been signed, we hoped that the Team-leader elect, Dr J H Bean, would visit Egypt about the end of January to commence the detailed planning of the project. It would be most desirable for the GS&MA's counterpart to Dr Bean to have been named by then and Mr Moustafa promised that this would be done. (Dr Bean's visit was postponed at the request of the GS&MA and he is now scheduled to start his visit to Cairo on 1 March 1979.)
- 1.9 Mr Moustafa then withdrew from the discussion (Messrs Barrington and Hughes had earlier returned to the British Embassy) and we continued the discussion with his deputy Dr Zaatout. We reminded Dr Zaatout that we had still not received the list of equipment required for the El Kharga laboratory (it will be recalled that ODM agreed to provide equipment up to a total cost of £12,000 for the laboratory being built in El Kharga). Shortly afterwards Dr Dardir, who is the Regional Director for the New Valley territory, produced a list consisting mainly of items of chemicals; we rejected this list pointing out that ODM would not meet the cost of consumables. A new list was given to us later and this again is not what was expected. In the circumstances we consider that it would be sensible for Dr Bean during his forthcoming visit to ascertain exactly what type of activity is now planned for the Kharga laboratory, and then to draw up a fresh list of equipment in consultation with Dr Dardir.

2 In the middle of 1978 Mr Moustafa in a discussion with Mr D Parker, then First Secretary (Aid) at the British Embassy, had sought assistance with the appraisal of gold occurrences and with the beneficiation of nepheline syenite. We raised this matter with Dr Zaatout and in the case of the nepheline syenite request, pointed out that a very substantial capital investment would be required to establish an alumina industry based on that material. Dr Zaatout accepted this and said that they were still keen to examine the possibility of using local material to replace imported bauxite. The question they wish answered is whether their nepheline-syenite can be beneficiated to yield material of between 20 and 24% Al_2O_3 which could either be used in the manufacture of alumina locally or exported. We said that we would suggest to ODM that this question be referred to the Warren Spring Laboratory.

2.1 We cleared up some points regarding the interest of other aid donors or commercial houses in the areas containing the gold occurrences and we promised to discuss possibilities, subject to ODM approval, with the Warren Spring Laboratory.

3 Following a discussion with Mr Leslie Hughes regarding the question of project transport, particularly the difficulties of protracted delivery delays, customs entry problems in Egypt etc, we visited on 10 December the British Leyland agent in Cairo. He told us that he would almost certainly be able to supply Landrovers and a Rangerover from his stock in time for the start of the Southern Desert project in late September 1979 provided he were given firm orders 3 to 4 months beforehand. We have already conveyed this information to Mr Barnes in charge of ODM's Egypt desk and recommended that if at all possible vehicles be purchased in Cairo rather than export them ourselves from the UK. We were given to understand by the British Leyland agent that exemption from the payment of duty on vehicles purchased by aid donors has been granted in the past.

4 We paid a brief visit to the University of Cairo on 10 December and had a discussion with the Professor of Geology and members of his teaching staff.

5 We were entertained to dinner by the Geological and Mining Authority on the evening of 10 December. The Chairman of the Board of Directors was unable to be present and Dr Zaatout presided in his absence.

6 Acknowledgements

We are grateful to the Chairman, Geological and Mining Authority for the generous hospitality shown to us. We should also like to express our appreciation of the arrangements made for our visit by Mr L F S Hughes and we particularly enjoyed his kind hospitality. Mr M J Duckering's help is also much appreciated.