AI HAJAR

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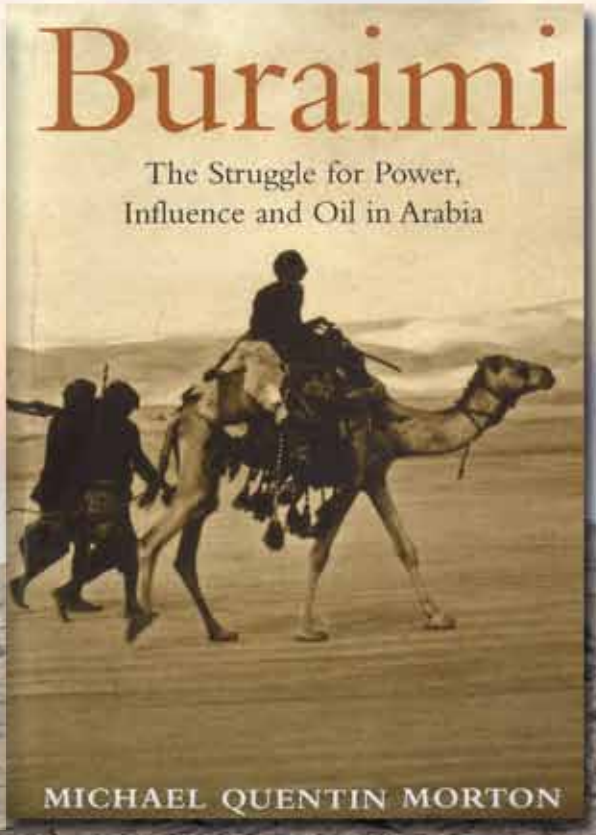
Contents



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Geological Society of Oman

Internet: www.gso-oman.org

Al Hajar

Geological Society of Oman
Quarterly Newsletter

President's message

Dear GSO Members,

It is my pleasure and pride to address this new Al Hajar Edition. You shall find a lot about our recent and upcoming activities in the edition's articles. I should thank GSO's honorary member Dr. Alan Heward for continuing to deliver very exciting and informative articles for Al Hajar. I am also very grateful to Yousuf Al Sinani for designing and editing this edition.

GSO has achieved a number of milestones and delivered many events last season and we are looking forward for another busy and exciting schedule from Sep 2014 to May 2015. The society has at least 5 talks and 6 fieldtrips in this season, spanning different topics of geology and visiting various wonderful geological wonders of Oman. Beside the events, GSO is involved in a number of scientific and education projects. We have just delivered a highly-appreciated event for kids, called Geo-kids. We are considering repeating this for GSO members' kids in the near future. Moreover, we are currently designing a geological museum for the Ministry of Oil and Gas and shall present you with a final agreed plan once the final approval is received. In collaboration with the Ministry of Education, the society is also considering to purchase a mobile educational planetarium and geological museum that can travel across the schools in Oman to introduce geology and astronomy to the kids. The preservation of the geological sites in Oman is undergoing in alliance with the Ministry of Commerce and we shall propose our final protection measures to the Council of Ministries very soon.

The outlook of the upcoming years looks very bright and we look forward to deliver essential knowledge-sharing projects for our members and the country.

Dr. Mohammed Al Kindi
GSO President

Note from the Editor

Welcome to the 20th Edition of Al Hajar.

In this edition, you can find a review of the precious rock collections from Oman made by Wilfred Thesiger during his first crossing of the Empty Quarter in the winter of 1946 and spring of 1947. Alan Heward also would like you to help him identifying a jebel's picture published by Edward Henderson. The picture reads Jebel Fahud, but it does not look like it!. Alan also provides a very interesting book review titled "Buraimi …The struggle of Power, Influence and Oil in Arabia". A number of events in the history of Oman and the U.A.E. over the past 75 years can be understood more clearly in the context of this account of the decades-log sore of Buraimi.

Several GSO field trips and events have been reviewed as well in this edition, including GSO's trip across the Khuff section of the Saiq Plateau through the Permo-Triassic boundary, the 2nd SEG Middle East Geoscience Student Symposium fieldtrip to Amdeh Formation and Wadi Al Meeh and the GSO's geo-kids event.

Worth mentioning, we are currently planning the activities for Q4 2014 to Q1 & Q2 2015; therefore if any one interesting to present a talk or lead a fieldtrip please contact any of GSO committee members. You could view the updated event schedule from GSO's website (www.gso-oman.org).

I hope you will enjoy reading this edition. As always, any comments about the newsletter or contributions of articles you are all welcomed.

Yousuf Al Sinani
GSO Editor

AI HAJAR
Geological Society of Oman
Quarterly Newsletter

Wilfred Thesiger's Rock Collection from Oman

In the summer of 2013, I spent several weeks at the Natural History Museum in London picking conodonts, crinoid columnals, pieces of trilobite and fish and other microfossils from residues of the Amdeh concretions to help progress work on these faunas. When back in Malvern and unpacking some of our books and papers, it struck me that I should ask to look at the collection of rocks made by Wilfred Thesiger from Oman during his first crossing of the Empty Quarter in the winter of 1946 and spring of 1947. [1] [2] These are kept at the museum and were described by Game. [3] *They were some of the first glimpses of the surface geology of Interior Oman.*

Thesiger's early journeys in Oman and Yemen were undertaken on behalf of the Middle East Anti-Locust Unit (MEALU) in London, their aim being to investigate the habitats and swarming-grounds of desert locusts that had been a threat to food supplies in Africa and the Middle East during the 2nd World War. Whereas MEALU was welcomed by Saudi Arabia and a large-scale motorised campaign organised, interior Oman with its divided allegiances was off-limits. The less accessible areas of the Empty Quarter were unknown, as was what happened to the wadis draining southwest from the Oman Mountains. One map of the day had some of the wadis reaching the coast near Abu Dhabi. Was there permanent vegetation along the wadis where locusts could breed and swarm? For Thesiger, it was an opportunity to cross the Empty Quarter, *which he regarded as 'the final challenge of desert exploration' and a further personal 'test of resolution and endurance'.* [4] [5]

His journey began in Salalah on October 25 1946. He had permission from the Wali to travel only as far as Mughshin and during that journey he persuaded his beduoin companions to take him further through the eastern edge of the Empty Quarter to the Liwa oasis in the U.A.E. and back across the gravel plains of Oman (Figure 1). From the Haushi well they travelled down the sabkhas of the Huqf depression to Boi, across the Jiddat al Harasis to Yisbub, near Shuwaymiyah, and then back to Salalah by February 23 1947. On most of the journey they tried to avoid contact with people other than members of the Rashid or Bait Kathir tribes to which his four companions belonged. At one stage, near Liwa oasis, Thesiger was advised to ride his camel rather than walk as '*any Arab who came across your monstrous footprints would certainly follow them to find out who on earth you were.*' [2]

As in his previous journey in Arabia, he kept a detailed diary, [6] collected plants and insects for MEALU (run from the British Museum (Natural History) London) and took several rolls of black and white photographs. He also collected occasional archaeological artifacts, fossils and rocks and brought such finds back to museums where they would be interpreted and the results incorporated in the lectures he gave and the articles he wrote.

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[1] W. Thesiger, 1948. Across the Empty Quarter. The Geographical Journal, v.111, p.1-21.

[2] W. Thesiger, 1959. Arabian Sands. Longmans, Green and Co. Ltd, London, 326p.

[3] P.M. Game, 1950. Rocks collected by W. Thesiger in Oman, Arabia, in 1946-7. Bull. British Museum (Natural History), Mineralogy, v.1, p.15-24.

[4] W. Thesiger, 1987. The Life of My Choice. Collins, London, 459p.

[5] A. Maitland, 2006. Wilfred Thesiger: The Life of the Great Explorer. Harper Collins, London, 528p.

[6] Most of Thesiger's diaries and letters are held in the Modern Collections at Eton College. Unfortunately the whereabouts of the diary covering this epic journey is unknown.

[7] http://web.prm.ox.ac.uk/thesiger/index.php/thesigers-journeys/11-thesigers-journeys-in-arabia-first-empty-quarter-crossing-1946-7.html ; http://web.prm.ox.ac.uk/thesiger/index.php/thesigers-albums.html

Photographs taken using by a small Leica II camera, a yellow filter and Ilford black and white films. 'In Arabia I kept my camera in a goat-skin bag to protect it from sand.' W.Thesiger, 1987. Visions of a Nomad. Collins, London, 224p

It was after his October 20 1947 Royal Geographical Society lecture that the Director/Secretary of the society first suggested Thesiger should write a book, which he finally was persuaded to do almost a decade later.[5] That book, his first and best, was Arabian Sands.

I wanted to look at his rock collection from Oman to confirm that some of the acid igneous outcrops described by Game (and Thesiger 1948) were indeed the first descriptions of Al Khlata erratic pebbles (from Permo-Carboniferous Gondwana glacial deposits). [8] I was also interested to see how many kilograms of rocks Thesiger was prepared to carry in camel saddle bags on a 2000 mile trek, in addition to his foolscap diary, plant press, compass and field glasses, Leica camera and films, bags of Maria Theresa dollars, service rifles and ammunition, a medicine chest, barometer and thermometer, one or two reading books, water and food.

Thesiger picked up more than 50 pebbles, crystals or concretions from Mughshin, Wadi al Ayn, Wadi Umayri, Wadi Ghaba, a location probably a few kilometres southeast of Saiwan and around Boi. They weigh a modest 4.5 kg in total. The collection is rather quirky, what took his eye, rather than being typical or systematic. Some of the omissions, labels and mistakes in labels are as interesting as some of the rocks he collected. One suspects that much of the labelling was done at the end of the journey. Game makes comparisons with previous collections and understanding from Bertrand Thomas and G.M. Lees [9] to try to reconstruct Oman's geology.

I had not realised previously that Thesiger's renowned photographs are also surprisingly selective, subjects that interested him, mainly portraits of people in tribal dress, sculptured sand dunes with shadows, camels and his companions on them, and activities around wells or campsites,[7] rather than more typical views of landscapes, big skies or terrain where samples were collected (Figure 2). A number of the negatives of the photographs show damage that is not present in photographs printed immediately after his journeys for his albums (damage that is assumed to have occurred in his flat in Chelsea, Philip Grover pers. comm.).

The first specimen is from Mughshin, not what you would expect, gypsum desert roses, or chalcedony geodes from the Rus he describes as brought there by floodwaters in his account of the 1945-6 journey. [10] Instead it is a rather odd cylindrical silica concretion (Figure 3A). For reasons that are not known, this and a few other specimens are not listed or described by Game (Table 1). Thesiger and his companions stayed nine days camped at Mughshin while they debated the way forward given a serious injury to one of the party, Thesiger's goal to cross the Empty Quarter, the poor state of some of their camels, and their limited remaining provisions.

The next collection of pebbles is from Wadi al Ayn on the return journey back through Oman having crossed the Empty Quarter (Figure 4). He '*saw no rocks, stones or even gravel during the 450 mile journey between Mughshin and'* here.[1] In Wadi al Ayn he spent eight days camped at Khaur Khadra (between Daleel and Bushra) whilst several of his party went into Ibri to buy food and enjoy the attractions of the town. The rock collection is a fairly typical association of Semail and Hawasina pebbles from the catchment area of the wadi and the 'nephrite' pebble is probably no more than an altered ultramafic (Figure 5.4; Mike Searle pers. comm.). One sample of quartz porphyry is clearly mislabelled and from the Al Khlata of the Huqf (Figure 4A). The latter is of a distinctive, attractive, desert vanished type that I have collected numerous times from Point Lookout, south of Jarf, in the southern Huqf.

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8 J.F. Aitken, 2006. Geology an inexact science: An example from the Permo-Carboniferous Al Khlata Formation. Al Hajar, 10th Edition, p.3-6.

9 G.M. Lees, 1928. The geology and tectonics of Oman and parts of south-eastern Arabia. Q.J.G.S., v.368, p.585-670.

10 W. Thesiger, 1947. A new journey in southern Arabia. The Geographical Journal, v.108, p.129-45.

Further samples come from Wadi Umayri, again comprising Semail and Hawasina pebbles, cemented wadi gravels (Figure 4B) and a blade of selenite. As elsewhere, a number of the banded, silica rocks are likely to be cherts rather than rhyolites, although I did not ask to look at Game's thin sections. One banded chert clearly showed the relicts of radiolaria and was interpreted by him as such (Figure 5.4). Lees in his 1928 paper had described radiolarian cherts from the Hawasina, so Game would have been alerted to their presence. [11]

On the journey between Wadi Musallim and Wadi Ghaba the party passed within a few kilometres of the prominent landmark of Qarat Kibrit which Thesiger describes as '*marking a depression 300 yards across and 15 feet deep where the Duru and Afar dig salt in shafts varying in depth from 10 to 20 feet. They fetch it in big caravans for it is of better quality than the salt from the deposits at Umm al Milh'* (Umm as Samim). 'F*rom the hillside they also dig sulphur which the Wahiba are allowed to carry away at times of truce as a cure for mange among camel.*' [1] The description conveys the impression that he visited the salt dome, yet there are no samples of salt, sulphur or stringer and no photographs of either of the hill rising above the desert plain or of the salt mining. In the journey from Wadi al Ayn to Haushi the party was accompanied by a Duru rabia, Muhammad, to whom Thesiger did not want to reveal his identity. He commented '*It was difficult to get the observations which I required for my mapping, and impossible to take photographs while Muhammad was with us.*' [12]

A few further pebbles were collected from Wadi Ghaba but nothing particularly of note (Table 1). Another blade of selenite was probably obtained from the Fars outcrops that are now extensively quarried east of Wadi Ghaba. A distinctive fragment of Minjur laterite was picked up probably near the Haushi well. The Haushi (Hawshi) well is located on the Mafraq geological map sheet, a few kilometres northwest of Qarn Mahatta Humaid. The party camped there for two days where they grazed their tired camels and slaughtered and dried the meat of a lame camel that had been brought to eat from the UAE.

The most interesting collections of rocks, to my mind, are from the Huqf depression (Batin el Mahai and the southern edge of Al Hagaf). '*Once more we rode across an empty land, but it was not only empty, it was dead.*' [2] '*Then for two days we struggled across the sabkhas, breaking through the surface crust at every step and foundering in the damp undersand. The infrequent ridges were chiefly composed of limestone, but here for the first time we found outcrops of red granite and of gabbro, and many fragments of porphyry, jasper and rhyolite.*' [1] This was Game's acid igneous suite.

There is some confusion as to collection dates (Jan 27 or 28) and quite where Batin el Mahai is. A label by Thesiger, in a specimen box containing three pieces of iron pan, describes the above variety of igneous and sedimentary rocks from 20 miles south of the HOSHI well (Figure 6). Batin el Mahai is marked on Thesiger's 1948 map about 35 miles south east of Haushi and east of the route taken by the party. The map was made based on compass orientation and camel pace/time, corrected to a few known geographical features. The cartographer commented that little correction was needed in this part of the journey. One might expect the 20 miles to be more accurate than a name of the area collected from one of his Rashid or Bait Kathir companions who were rather out of their normal grazing or camel raiding areas, but many of the names on the map are as we know them.

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11 Anglo-Iranian (BP) geologists were also busy in London in ~1948 recognising abundant radiolarians in Hawasina chert samples from Bait al Falaj, Ruwi. Red cherts yielded abundant highly spinose radiolarians, brown cherts, distinctive and less varied faunas. E. Lehner and D.C. Ion, Mar 1949. BP Archive, Warwick Univ., U.K.

12 W. Thesiger, 1999. Crossing the Sands. Motivate Publishing, Dubai, 176p

20 miles would make the location a ten kilometres south east of Saiwan-1 where there is a big spread of boulder-strewn terrain. The rocks are a fairly usual mix of granite, tuff, porphyry, rhyolite, limestone and sandstone (Table 1). What is clear though from the samples is that a number of the igneous ones are rounded Al Khlata clasts and not angular pieces weathered or broken from outcrops (Figure 6). I was hoping for some fossiliferous Haushi Limestone and had to make do with a few samples of probable Huqf dolomites. There are no really distinctive Khufai, Shuram or Masirah Bay lithologies.

The final sample is from Boi, numbered but not described by Game. It is an elongate iron concretion perhaps mimicking the form of a burrow (Figure 3B). The party spent four days camped at Boi where they met with several of their original party who had left them at Mughshin and whilst they grazed and watered their camels. There are surprisingly no photographs of the distinctive landscape around Boi or samples of fossil Orbitulinas or oysters that abound in the Nahr Umr or rudists from the Natih and Shuaiba. What did he spend those four days doing? A curious person might be expected to clamber to the top of the mesa and be rewarded with fine views over the well and wadi, the Qishn cliffs and the Huqf in the distance, by rudist fossils and much evidence of Neolithic hunters knapping flints.

Thesiger '*stayed at Salala for a week. I was busy writing up my notes, sorting out my collections, and arranging to travel with the Rashid to Mukalla.*' [2] Perhaps this is where much of the labelling was done. He also had an audience with H.H. Said bin Taimur that seems to have gone rather well. '*I have been to see the Sultan*,' he wrote to his mother on February 26 1947, '*and been offered and have accepted the job. I am to be his Minister of Foreign Affairs*.' [5] It is not clear what happened to the offer and acceptance, but about the same time Thesiger declined the offer of a role with MEALU supervising the destruction of locusts in the Hajaz in order to continue his travels in southern Arabia. '*I wanted the wide emptiness of the sands, the fascination of unknown country, and the company of the Rashid*.' [2]

As a sample of the wonderful geology and landscapes of Interior Oman, Thesiger's rock collection and photographs seem incomplete, [13] but they still represent some intriguing glimpses of an epic journey and of the complex driven character of a great explorer.[5] [14]

John Aitken was the first to alert me to the existence of Game's 1950 paper describing Thesiger's rock collection from Oman. I am grateful to Dave Smith (NHM, London) for facilitating access to that collection, to the museum for allowing me to reproduce Game's plate of photomicrographs and to Quentin Morton and Mike Searle for their comments on a draft of this article. Michael Meredith and Stephanie Coane of Eton College are thanked for providing access to the diaries and letters in their collections. Philip Grover and Alexandra Ross of the Pitt Rivers Museum, Oxford, helped in access to Thesiger's photographs. Petrogas E&P kindly sponsored the license fee to allow six of these to be reproduced in Al Hajar.

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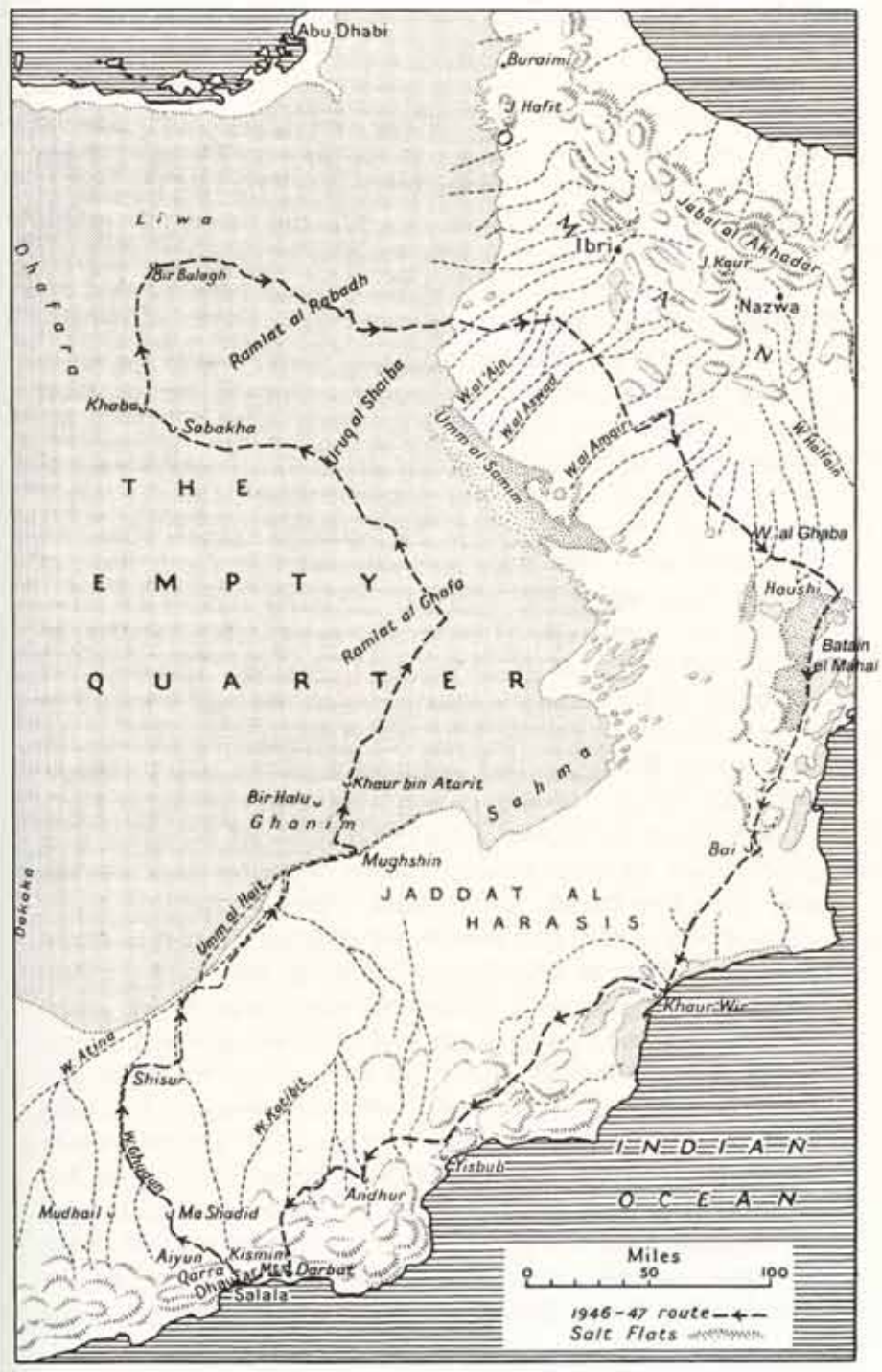
13 When the diary for this journey is located it may provide further clues as to locations, samples and photographs and explain some of the apparent gaps.

14 M.Q. Morton, 2013. Thesiger and the Oilmen: The Dilemma of oil exploration in southern Arabia. Oil-Industry, History, v.14, p.1-14



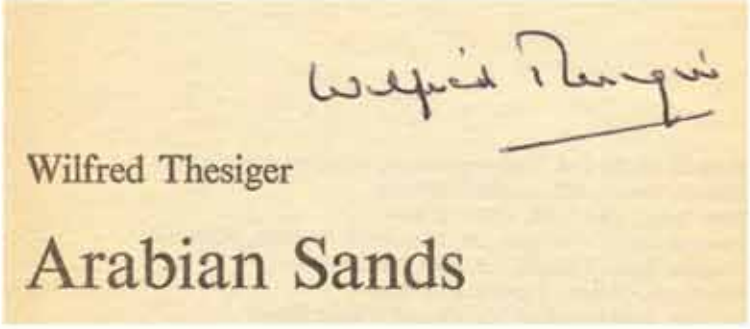


Figure 1. Route of first crossing of the Empty Quarter and return through Oman (from Thesiger, 1959). His distinctive handwriting (and ubiquitous underlining) can be recognised on many of the sample labels.

Thesiger with his companions for the whole of the journey. Left to right: Mabkhaut bin Arbain, Musallim bin Tafl, Wilfred Thesiger, Muhammad al Auf and Salim bin Kabina. Photo taken at Wadi Darbat towards the end of the journey. Various other individuals and groups of bedu joined them for different parts of the crossing and the return to Salalah.

Wadi al Mughshin, 16-24 November 1946.

Wadi al Ayn, 3-11 January 1947.

Musallim bin Tafl and dwarf palms (saf) in Wadi al Ghaba, 22 January 1947. Gravel plains and hills in the background.

Campsite probably ~5 km south of Ain Hindi in the southern Huqf with outcrops of thinly bedded Shuram Fm in the background. Around 28 to 30 January 1947.

Boi, gathering under an overhang of wadi gravels close to the well and cemetery. 31 January – 4 February 1947.

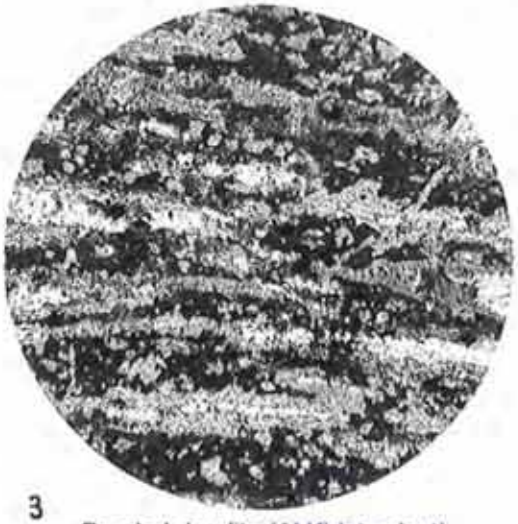
Figure 2. Photos of the journey relevant to this article. © Pitt Rivers Museum, University of Oxford.
(Acc. Nos 2004.130.6827.1, 2004.130.6466.1, 2004.130.6668.1, 2004.130.6692.1, 2004.130.6737.1, 2004.130.6745.1, 2004.130.6827.1).

Figure 3. A. Elongate, cylindrical silica concretion, possibly a worn fragment of a rather smooth-sided fulgurite, from Mughshin. B. Nobly, elongate iron concretion from Boi. Possibly mimicking a burrow. The specimen label is of interest, being the back of a British military Active Service envelope. Probably obtained when he was staying at the RAF camp at Salalah. The RAF also provided flights and presumably arranged for his collections and films to be sent on to London.

Figure 4. A. Two pieces of quartz-porphyry listed and labelled as from Wadi al Ain. They are almost certainly parts of an Al Khlata pebble from the Huqf depression and have been mislabelled. B. Several of the samples of gabbro, chert, limestone and cemented wadi gravels from Wadi Umayri.

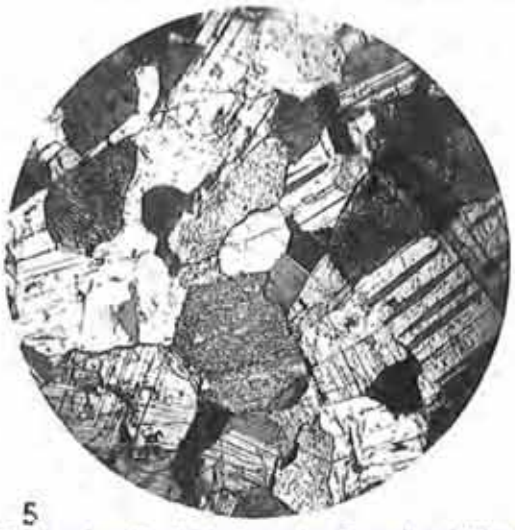
1 Granophyric granite (Al Khlata clast)

2 Acid tuff (Al Khlata clast)

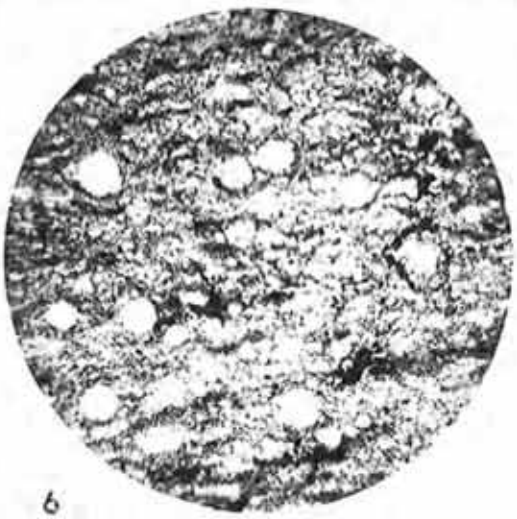


3 Banded rhuolite (Al Khlata clast)

4 Nephrite (wadi pebble from the Semail ophiolite)

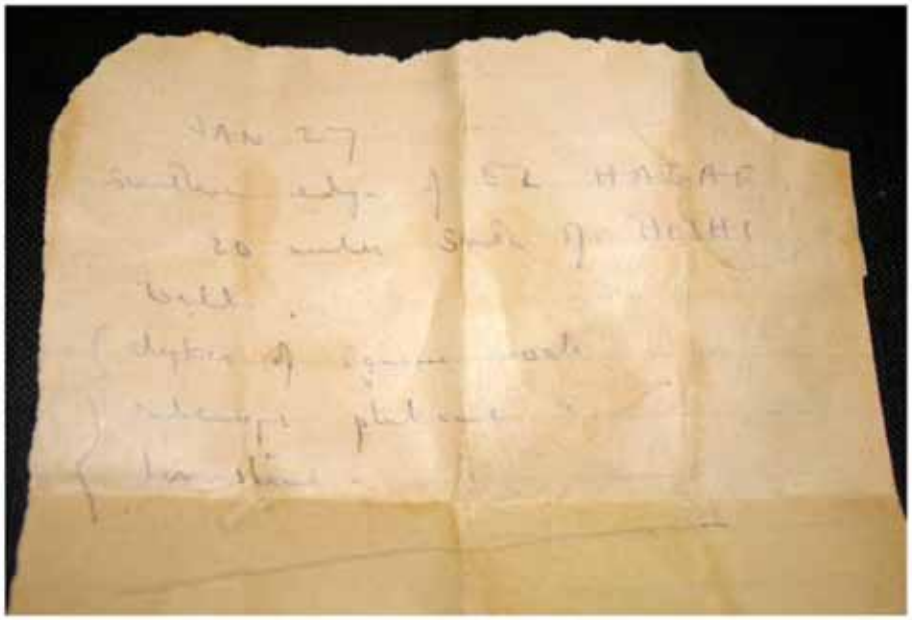


5 Gabbro (wadi pebble from the Semail ophiolite)



6 Banded radiolarian chert (wadi pebble from the Hawasina)

Figure 5. Thin section photomicrographs reproduced from Game (1950) with permission of the Natural History Museum. Text labels and modern interpretation have been added for clarity.



JAN 27
southern edge of EL HAGAF
20 miles south of HOSHI
well
{dykes of igneous rocks
{outcrops plutonic "
{limestones

Figure 6. Confusing labels, both in Thesiger's handwriting. Collection of igneous rocks from Batin el Mahai, all are Al Khlata glacial erratic pebbles, showing varying degrees of weathering and desert varnish. Several of the pebbles are clearly rounded.

Table 1.

NHM Min. Dept Register	*Game (1950) Description*	*Weight (g)*	*Additional Comments APH*
Mughshin			
No number.	Not listed.	187	Cylindrical siliceous concretion. Possible fulgurite?
Wadi Al Ayn	(Khaur Kadhri; between Daleel and Bushra)		
BM.1947, 369 (38)	Altered olivine-gabbro?	44	3 pieces of wadi pebble. Semail ophiolite, Ibri area.
BM.1947, 369 (39)	Quartz-porphyry; purple, with conspicuous white feldspars.	30	2 irregular pieces with desert pitting and varnish. Label says 'Wadi Al Ain,' but part of a distinctive porphyritic Al Khlata clast from the Huqf and somewhere mislabelled.
BM.1947, 369 (40)	Rhyolites; pale green to chocolate brown; dense silicified type; sub-conchoidal fracture.	106	4 pieces. Most likely Hawasina chert rather than rhyolite.
BM.1947, 369 (41)	Nephrite; greenish-black; dense, SG 3.049; fine-grained; hackly texture. Water-worn pebble of back jade. In thin section (TS) has 0.1mm randomly oriented fibres of tremolite-actinolite.	27	5 cm pebble, presumably derived from some of the altered deeper sections of the Semail ophiolite, Ibri area. **Photomicrograph figure 5.4.**
BM.1947, 369 (42)	Limestones; dark-coloured; buff-coloured; very pale grey and white; 'Rillensteine'.	91	6 small limestone pebbles. Not noticeably fossiliferous and probably of fine-grained, deep-water carbonates in the Hawasina. Typical desert micro-karst weathering.
BM.1947, 369 (43)	Oolitic limestone; straw coloured.	5	2 cm piece perhaps derived from the Hawasina Guwayza Fm.
Wadi Umayri	(around 25 km SSE of southern end of Jebel Fahud)		
BM.1947, 369 (28)	Anorthosite. Coarsely crystalline in TS, consisting of bytownite-anothite with sub-ordinate hypersthene.	24	3 small wadi pebbles. Semail ophiolite, Bahla area.
BM.1947, 369 (29)	Gabbro (?) fine-grained; partly decomposed	87	5 pieces of pebble, the largest being 5 cm. Semail ophiolite, Bahla area.
BM.1947, 369 (30)	Gabbro, consisting of plagioclase and diopside. Even grained in TS (1 mm) plagioclase (bytownite-anorthite) and pyroxene (with schiller inclusions).	76	Single small wadi pebble. Semail ophiolite, Bahla area. **Photomicrograph figure 5.5.**
BM.1947, 369 (31)	Radiolarian chert; dull olive-green; very dense; subconchoidal fracture; silicified; banded. Cryptocrysalline in TS with evidence of banding from original bedding. Tests of radiolaria replaced by radiating fibrous chalcedony packed together in spherulites avg 2mm diam.	113	3 sub-angular pieces of rather typical Hawasina chert up to 6 cm. Hamrat Duru upstream Wadi Umayri. **Photomicrograph figure 5.6.**
BM.1947, 369 (32)	Rhyolites; cream coloured; pale-grey and dark-grey; banded; silicified types.	317	Most likely banded Hawasina cherts rather than rhyolites.
BM.1947, 369 (33)	Limestones; blue-grey; 'Rillensteine'.	81	2 well rounded pebbles <5 cm. Not noticeably fossiliferous of dark grey, fine-grained, probably deep-water carbonate from the Hawasina. Typical desert micro-karst weathering.
BM.1947, 369 (34)	Limestone; pale grey-green variety.	44	9 cm flake of fine-grained carbonate, almost like pottery.
BM.1947, 369 (35)	Sandstones; conglomeratic, with pink sandy limestone pebbles up to 6 mm diameter; calcareous cement; also gritty sandstones.	352	5 pieces of cemented wadi gravels. Pebbles rounded cm-size.
BM.1947, 369 (36)	Quartz and jasper.	595	7 pebbles, many appear Hawasina chert.
BM.1947, 369 (37)	Gypsum (selenite).	48	12 cm blade of selenite.

Wadi Ghaba	(around 7.5 km NE of Ghaba-1)		
BM.1947, 369 (45)	Jasper.	53	2 pieces. Likely Hawasina chert.
BM.1947, 369 (46)	Sandstone; ferruginous.	52	Cemented sandstone. Label in tray says 'Wadi Al Ain.'
BM.1947, 369 (47)	Rhyolites; grey; pale-green and dark-green; silicified; banded.	19	4 pieces. Likely banded Hawasina chert.
BM.1947, 369 (49)	Not described.	93	Hard compact silica rock, resembles some of the Tertiary 'silcrete' crusts known from area.
BM.1947, 369 (50)	Not described.	41	11 cm blade of selenite, probably from the Miocene Fars Gp (Dam Fm).
No number.	Not listed.	40	Piece of crumbly red pisoidal laterite typical of the Minjur Fm in the N Huqf.
Batin el Mahai	(around 10 km SE of Saiwan-1?)		
BM.1947, 369 (1)	Granite; pink; medium-grained, non-porphyritic; fresh. Granophyric in TS with well developed micrographic intergrowth of quartz and orthoclase.	255	Part of a >9cm clast from the Al Khlata Fm. Dimpled polished desert appearance. Label in tray 'Jan 28 Batin el Mahai.' **Photomicrograph figure 5.1.**
BM.1947, 369 (2)	Granite; weathered; biotite-rich type.	53	2 weathered fragments from a larger clast of coarse-grained granite.
BM.1947, 369 (3) & (4)	Microgranites; purple (3) and salmon coloured (4)	86	1 purple flake and 2 other salmon-coloured pebbles, 1 being well rounded. Typical small, desert varnished Al Khlata clasts.
BM.1947, 369 (5)	Aplite	47	Rounded clast that has been broken prior to thin sectioning. Slight patina to exterior.
BM.1947, 369 (6)	Acid tuff; dull purple. Abundant phenocrysts of orthoclase and quartz averaging 2 mm. Well developed vitroclastic structure in TS in a dominantly glassy base. Most of orthoclase crystals have undergone some corrosion before ejection and are haematite impregnated.	124	Distinctive, attractive, porphyritic Al Khlata clast type. Broken in two for thin sectioning. **Photomicrograph figure 5.2.**
BM.1947, 369 (7)	Feldspar-porphyry; dull olive-green.	32	2 parts of a pebble.
BM.1947, 369 (8)	Rhyolite; grey; banded. Composed of microcrystalline quart-feldspar aggregates in TS, Flow-structure is expressed by dusty, semi-opaque shreds of secondary, kaolinised material.	61	Parts of a banded pebble. **Photomicrograph figure 5.3.**
BM.1947, 369 (9)	Limestone; grey brown.	26	2 fragments, 1 part of a pebble and is veined by thin calcite veins, the other not.
BM.1947, 369 (10)	Not described.	38	8.5 cm blade-like fragment of banded dolomite. May be fragment of stromatolitic Khufai Fm.
BM.1947, 369 (11)	Grey marl.	38	Marl? Net-like iron concretionary feature on one surface.
BM.1947, 369 (12)	Quartzite; pale grey.	82	Perhaps a clast from conglomerates of the Amin Fm.
BM.1947, 369 (13)	Calcite rhomb.	7	2 cm clear calcite crystal.
BM.1947, 369 (14)	Calcite, coarsely fibrous.	49	2 pieces of red-stained fibrous calcite beef.
BM.1947, 369 (15)	Chalcedony.	32	4.5 cm long fragment.
BM.1947, 369 (16)	Sandstone; grey to brick-red; soft, loosely cemented; contains glauconite.	?	2 pieces, both fine grained. One mottled red and other less red. Not diagnostic of fn. Glauconite?
BM.1947, 369 (17)	Iron pan crusts.	46	3 pieces of iron pan. Label in tray in Thesiger's handwriting reads 'Jan 27 Southern edge of EL HAGAF, 20 miles south of HOSHI well, dykes of igneous rock, outcrops of plutonic rock, limestone.'

El Hagaf	(**southern edge** shown by Game as near Boi)		
BM.1947, 369 (18)	Biotite-granite; pale-brown to cream-coloured; medium grained.	132	
BM.1947, 369 (19)	Gabro; uralitised.	201	Part of a pebble.
BM.1947, 369 (20)	Rhyolite; black; banded.	51	2 parts of a pebble.
BM.1947, 369 (22)	Rhyolite; pale-green to chocolate brown; dense silicified type; sub-conchoidal fracture.	78	3 pieces. Chert or rhyolite?
BM.1947, 369 (23)	Limestones; grey-brown and cream coloured.	70	3 pieces. Huqf carbonates? Khufai Fm?
BM.1947, 369 (24)	Sandstone; pale pink; friable.	40	Fine-grained, feldspathic, possibly Gharif Fm.
BM.1947, 369 (25)	Sandstone; cream-coloured; fissile; cemented by a calcareous matrix containing salt (halite).	25	Four exfoliated flakes of hard white sandstone. Label in tray Jan 27, Southern edge of EL HAGAF.
BM.1947, 369 (26)	Jasperoid quartz.	49	Pebble.
BM.1947, 369 (27)	Iron pan.	238	3 pieces largest 9 cm. Label in tray Jan 27, Southern edge of EL HAGAF.
BM.1947, 369 (51)	Not described.	41	Elongate flat iron concretion possibly from the Nahr Umr or overlying Natih equiv. shales. Label in tray is 'Boi', on the back of a military 'Active Service' envelope.
		4.52 kg	

Where is this jebel in the Oman Mountains?

Whilst re-reading books by Edward Henderson I came across the picture on the left below [1] . I have enlarged the crestal part on the right. Henderson, or 'Bin Hender' as he was known around Buraimi, was a political representative of the Iraq Petroleum Company in the U.A.E. and Oman, and later became a British diplomat. The photo caption reads 'Jebel Fahud from the air, 1950' and I have previously thought it was a bit of an odd view. On closer inspection it clearly isn't Fahud. It is not a dipping limb of the eroded dome, but a plunging asymmetric anticline with one quite steep limb, there is a wadi nearby, and a number of smaller disharmonic? folds in the vicinity.

Does any GSO member recognize the location of this feature?

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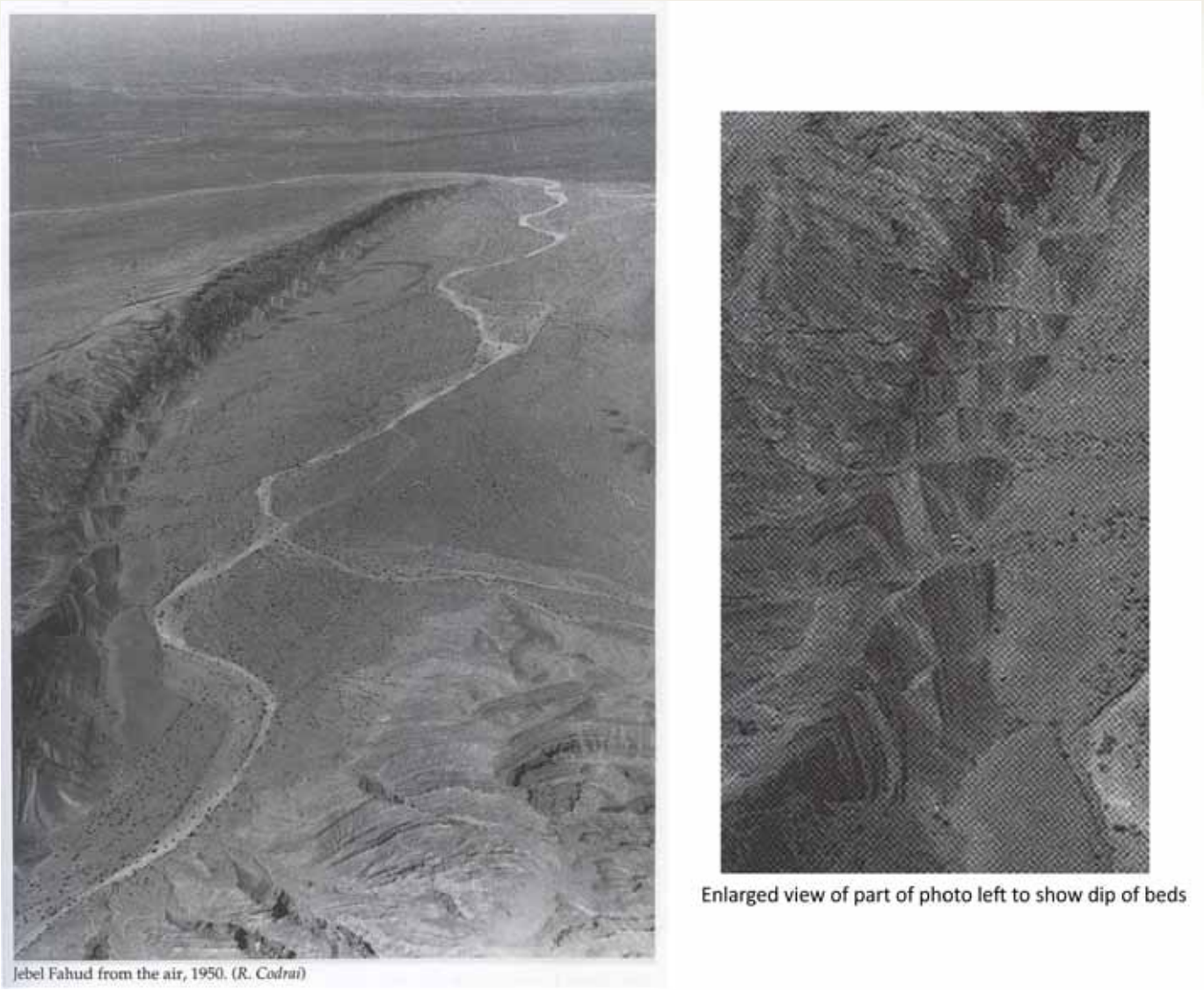

Jebel Fahud from the air, 1950. (*R. Codrai*)

Enlarged view of part of photo left to show dip of beds

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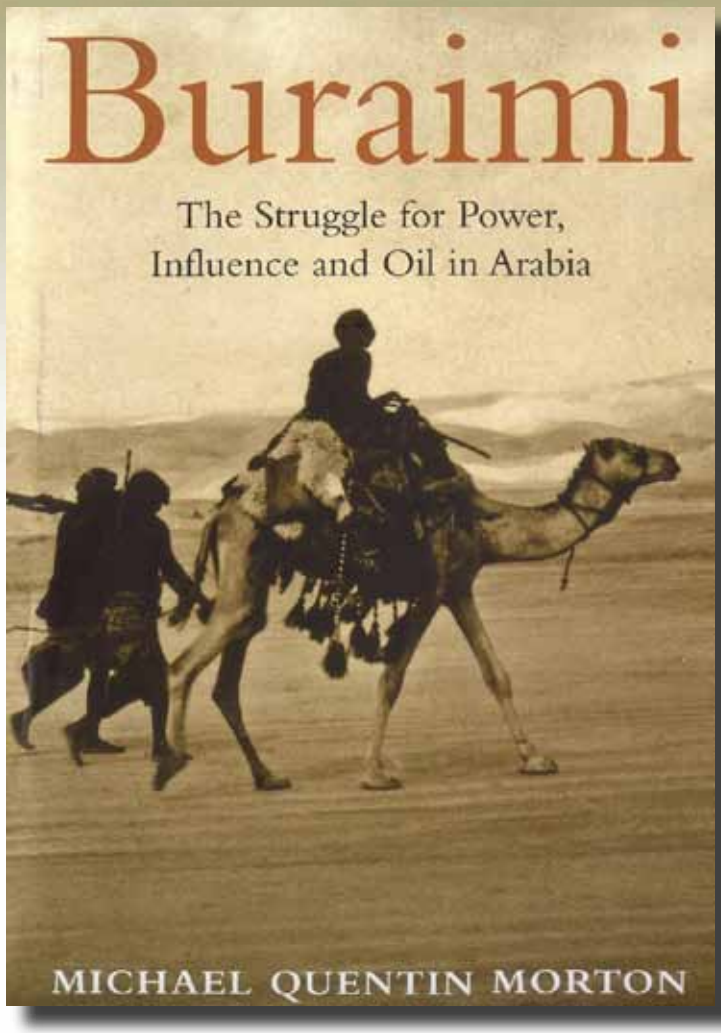
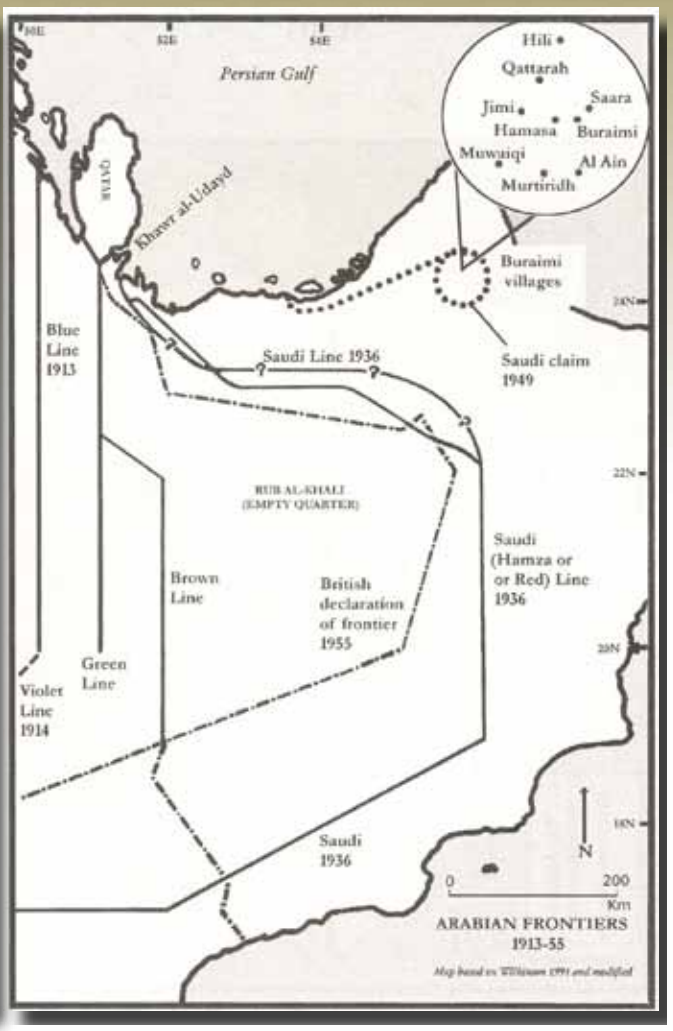
1 Henderson E. 1988. This Strange Eventful History: Memoirs of earlier days in the UAE and Oman. Quartet Books, London, 184pp. Henderson E. 1999. Arabian Destiny. Motivate, Dubai, 272pp. (A more complete autobiographic version of This Strange Eventful History).

Book Review:
Buraimi- The Struggle for Power, Influence and Oil in Arabia,

by Michael Quentin Morton, 2013. I.B.Tauris. 304p. Hardback. Available from Amazon for 15-25 GBP. ISBN 9781848858183.





This book is about the Buraimi dispute that propelled the nine oasis villages on the border of Oman and Abu Dhabi onto the world stage in the 1950s. It was played out between Saudi Arabia, Abu Dhabi, Oman and Qatar; the British and American governments; and the oil companies Aramco and IPC (Iraq Petroleum Company). Its origins lay in the lust for power and oil in a sparsely populated desert region where, until Aramco started asking where the boundaries of their revised oil concession were in 1948, there had been no need for borders between countries.

'The world watching these events, and observing the protracted diplomatic squabbles which accompanied them, generally assumed that Buraimi sat bang on top of a fabulous oil-field.' [1]

At the time for political reasons it was not possible to access, survey and drill Jebel Hafit, but was this 900 m high whaleback an indication of what lay under the sands between there and the Ghawar field, discovered also in 1948. Geophysical techniques of gravity and seismic that would reveal structures under the desert or the sea began being used a few years later. We now know from the results of Indago Petroleum's 50 MM$ Al-Jariyah-1 well in 2008, most likely Buraimi does not sit on top of an oil field. The dispute was much bigger than an oil field under Buraimi, it was about the quest for control, or influence at least, over the peoples and wealth of much of Arabia.

The author is Quentin Morton whose father Mike was involved in the early exploration for oil in Jordan, Yemen, Oman,[2-4] Kurdistan (Iraq), Qatar and Abu Dhabi. Some may remember Quentin (and Gill) from the GSO fieldtrip to Fahud in 2006 and his Al Hajar article in 2004.[5] 'Buraimi' is the third book by him on topics stirred by his father's diaries, papers, books and photographs.[6]

As a barrister, Quentin is well placed to lead the reader on a logical and balanced path through an abundance of source material from the U.K., U.S.A. and Middle East*, and also make clear the goings-on at the Buraimi Arbitration Tribunal held in Geneva in September 1955. Eventually the Saudi policemen, successors of the Saudi representatives who first came to Hamasa in August 1952, were expelled by force in October 1955, along with various sheikhs and tribesmen who had enjoyed their largesse. There would have been a different ending had the three Omani sheikhs been sent to Muscat rather than exiled to Dammam. The disputed borders were hastily forced-through by the British before they withdrew from the Gulf in 1971 and finally settled by the leaders of Saudi Arabia, Qatar, Abu Dhabi and Oman, as was the ownership of the giant, cross-border, Shaybah-Zarrara oil field (discovered on both sides in 1968 and brought on-stream by Saudi Aramco in 1999). Or were the borders and terms fully agreed and implemented, and is there room for future ambiguities, tensions and developments?

A number of events in the history of Oman and the U.A.E. over the past 75 years can be understood more clearly in the context of this account of the decades-log sore of Buraimi. It is perhaps a blessing that the early exploration wells in Oman and Dhofar were either dry or found heavy oil, as major discoveries in interior Oman in the mid to late 1950s would have only added fuel to the fire. It's an intriguing story and I was left feeling that maybe it is not yet quite over.

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1. Morris, J., 1957. Sultan in Oman. Faber and Faber, London, 165p.
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3. Morton, D.M., 1959. Geology of Oman. Proc. 5th World Petrol. Congr., New York, 1, 277-294.
4. Morton, D.M., 1959. Oil structures of Oman. World Oil, 57, 146-150.
5. Morton, M.Q., 2004. Geological exploration in Oman:The early years. Al Hajar, 4th edition, Novem ber 2004, p.2-4.
6. Previous books being 'In the Heart of the Desert' (2006) and 'Black Gold and Frankincense' (2010). A further book 'The Third River,' an account of the Iraq Petroleum Company 1887-1979, is in press.

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*** There is a lack of archive material available from the Saudi Arabian government for the period that might provide additional perspectives.**

GSO visit across the Khuff section of the Saiq Plateau (Southern Jabal Akhdar): a safe journey through the Permo -Triassic boundary

by : L. Bazalgette

A one - day field trip to the Saiq Plateau was organized by the Geological Society of Oman on February 28th, 2014. The event gathered 24 people and was lead by Dr Irene Gomez - Perez and Mr Suleiman al Farqani (being both Exploration Geologists at PDO). The aim of this visit was to travel across a very nicely exposed section going through the Saiq and Mahil formations in the Southern Jabal Akhdar flank (Saiq Plateau). These formations are time equivalents and good facies analogues of the world famous Permo - triassic Khuff, which contains amongst the most prolific gas reservoirs in the Middle East. From a more general geological interest, the Khuff formation is of course also noticeable as its deposition time is distributed around the famous Permian -Triassic boundary, characterized by one of the most important mass extinctions recorded by the Earth.

1-The basal section

The first outcrops were located at the almost immediate vicinity of the Jabal al Akhdar hotel. There, was exposed the very basis of the Saiq section including clastics (AKA Basal Khuff clastics) and their transition to carbonates (limestones). These carbonates are essentially composed of packstones which evolve upwards to grainstone or wackestone facies. There, the field trip participants could observe a very rich fauna including a rich variety of mollusks (brachiopods, bivalves), echinoderms (crinoid debris), foraminifera and rather impressive pieces of coral. In these series, the packstone facies is classically interpreted as formed of storm remobilized deposits. The observed fauna is quite typical of an open marine environment.

Figure 1: (a) A great introduction to the day and to the Khuff formation by Suleiman al Farqani (photo by Issa al Mahruqi). In the background, the lowest part of the Saiq formation. (b) A beautiful example of fossil coral in the lower Saiq formation (photo by Issa al Mahruqi). (c) Beds with fossil coral got deformed during the complex structural history of the Jabal al Akhdar. This example shows a shear zone with dextral strike-slip tendency (Photo by Loic Bazalgette). (d) Contact between a low energy bioturbated wackestone bed (light brown) and a much higher energy bioclastic packstone (dark grey). The packstone may represent a strom bed (photo by Loic Bazalgette).

2- The Khuff series and the Jabal Akhdar landscape

The outcrop visited during the second stop enabled the participants to enjoy a fantastic landscape view covering the upper part of the Saiq series as well as the contact with the Lower Mahil member. The top of the section corresponds to the top Khuff with overlying breccias followed by the more clayey Sudair carbonate formation. The weathering of the exposed sections involved color changes and relief heterogeneities that were observable from the distance. Hence, dark color (brown to black) beds forming steep cliffs could be interpreted as clean, high energy carbonates locally affected by fabricpreserving dolomitization. These lithologies potentially present the best reservoir quality. Conversely, lighter grey intervals forming slopes with a much shallower angle represented wackestones which are described as tight in the subsurface.

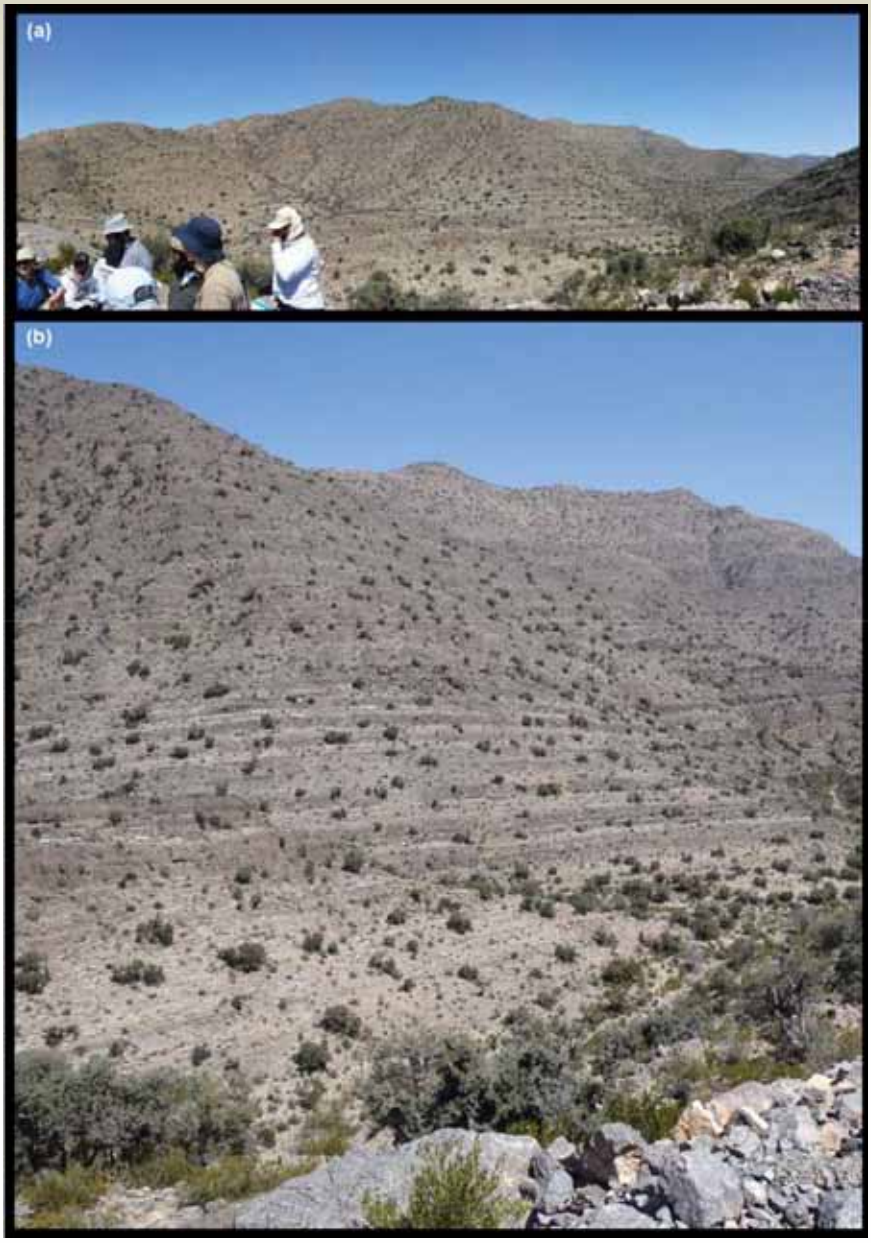

Figure 2: The Khuff in the landscape: aAn almost complete section covering the Saiq and Mahil formations. (a) General panorama (photo by Issa al Marhuqi). (b) detailed view(photo by Loic Bazalgette). Note the color changes between the different layers. These changes can be correlated with lithological facies alternations.

3- The Permo-Triassic boundary

Finally, the third stop allowed the audience to walk across the famous Permo-Triassic boundary. As it has been introduced earlier this episode corresponds to one of the most, if not the most, dramatic mass extinction events in the history of our planet. Though the causes of the extinction are not clearly established, a drastic change of fauna is classically observed below and above this boundary. This change makes the Permo-Triassic boundary a very useful marker enabling stratigraphic correlation at basin (and even larger) scale. During the outcrop visit, series of almost azoic graded packstones were observed at close proximity of the boundary. This high energy facies included intervals with flat pebble conglomerates. They were interpreted as storm beds characterizing the base of the Mahil formation.

Figure 3: Going across the Permo-Triassic boundary. (a) One of the last corals found before the Permian mass extinction. (b) and (c) storm bed (high energy packstone) with flat pebbles. (d) Thrombolitic dolomite facies. (b), (c) and (d) were found after the Permo-Triassic boundary (all photos by Loic Bazalgette).

Eventually, the field visit ended up with the traditional group picture. All participants have shown great appreciation for a very pleasant and fruitful day spent on the field. The trip leaders were acknowledged for sharing their expertise and for making the event successful, technically very informative and also extremely enjoyable.

Figure 4: A happy bunch of attendees at the end of the day (photo by Hussein Al Riyami). (b) and (c) The leaders at work (photos by Issa al Mahruqi). (d) An almost unnoticed participant slightly worried because of all this stories of mass extinction

(photo by Loic Bazalgette).

2nd SEG Middle East Geoscience Student Symposium FieldTrip

As part of the collaboration with the Society of Exploration Geophysicists (SEG), GSO has arranged a one day field trip on the 29th of April for the attendees of the 2nd SEG Middle East Geoscience Student Symposium, which toke place in Muscat at the Sultan Qaboos University. Around 40 students have participated in the fieldtrip. The fieldtrip started with safety briefing and an introduction to the geology of Oman. The first stop was in Wadi Amdeh to see Amdeh Formation and some sedimentary structures. The second stop was in Wadi Almayh where the attendees spent time studying the fault and fold structures present in the wadi to understand the tectonic evolution of the region. The last stop was in Qantab area to observe the ophiolite rocks and study their mineralogical composition.

A Trip To The Rock's World

By " Noura AlAbri"

On the 25th of August about 33 students from ages between nine to twelve years, had a chance of being a wonderful young geologist while participating in the "Trip To The Rock's World" event, organized by GSO and held in Sultan Qaboos University. Students were registered in this event through GSO's website, following an advertisement in public media, including GSO's website, Twitter and Facebook. The registration included a number of important safety and logistical checks before the registration was confirmed.

The event aimed to identify the basic geological concepts of rocks and its application for kids. General topics were discussed, such as describing earth's inner components, understanding the rock cycle and getting basic information about the rock types. Students were divided in six groups and the competition between these groups started at the first stage of the event. The organizing team divided the program to short seminars using PowerPoint slides, videos and different experiments like "make your igneous rock", "fossils craft" and "metamorphic cake". Each student was provided with a notebook full of pictures, graphs and activities.

In order to create an exciting and practical environment, three competitions were done with active and funny surroundings. The program ended with a 2-hours fieldtrip to wadi Al Khoud. The fieldtrip gave the chil¬dren a great chance to see and touch the rocks in nature and identify the different types of rocks surrounding them. Many benefits were gained for both students and organizers. Students got closer to geology and knew its different applications in our life. On the other hand, organizers were able to identify the importance of such interesting events for students to learn and enjoy geology, and how to improve these events in the future.

Each student got a useful file with booklets and certificates. The students expressed a great joy and enthusiasm to learn more about geology. At the end the winner group was announced.

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