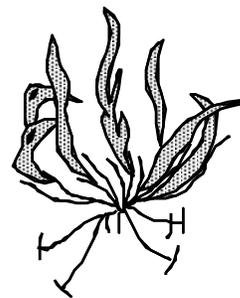

Geological Society of Zimbabwe



Newsletter

June 2010



*Dr Matt Carrano, Curator of Dinosaurs at the Smithsonian and Dr Eric Roberts of the University of Southern Utah examine sedimentary strata in the Ntunbe dinosaur footprint locality, Chewore Safari Area, May 2010.
Photo Credit: Lucy Broderick*

THE GEOLOGICAL SOCIETY OF ZIMBABWE, P.O. BOX CY 1719, CAUSEWAY, HARARE

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Editorial

As we present the first Newsletter of Daniel Chatora's Chairmanship, the emphasis is on the proceedings of the AGM held at the Sports Club, Highlands on Friday 19th February. Forbes Mugumbate records his report to Members for his year of office in 2009. Anyone with an interest in the accounts can pursue these through our Honorary Treasurer, Collins Mwatahwa on cmwatahwa@unki.co.zw. In addition there are citations for the A.E. Phaup and Mike Vinyu awards for 2009, which were presented at the AGM dinner when Dr Tony Martin was welcomed as an Honorary Member of the Society for his outstanding contributions to our affairs over the years. Tony had to work for his supper as he preceded dinner with a well-illustrated presentation on *The Wanderings of a Consulting Geologist*, a quest that has taken him all over the World. The Keith Viewing Award for the best paper presentation at our annual symposium was made to Hillary Gumbo on the subject of *3D Earth Exploration*.



Photo Credits – Lucy Broderick

Our contributors, Maideyi Meck and Bornwell Mupaya keep us abreast with happenings at the Geology Department, the Geological Survey and within the mining industry of Zimbabwe, and thanks are expressed for their continued support in writing these columns. Please take note of the Second Circular to the Centennial Symposium published in this Newsletter. The event is being organized through a sub-committee chaired by Andrew du Toit. Your response through the Symposium Secretary, Lesley Frost, indicating your commitment to this event is urged. We would like to celebrate in style and welcome visitors from beyond our borders.

On a sadder note, we record the death of Ben Worst, a doyen of the old-time Geological Survey. Coupled with my obituary to Philipp Oesterlen, presented at the AGM and published in the February Newsletter, the record of their respective contributions to the Geological Survey is in effect a celebration as it is the personalities that have made that institution great and not the walls that enclose it, as wonderful as the 1940's Italian POW workmanship may be.

The cover photo refers to the third Chitake/Ntumbe Dinosaur Expedition to Mana Pools and Chewore led by Eric Roberts and facilitated by yours truly. Three new plaster casts were recovered from the Chitake *Syntarsus* bone bed, a new articulated specimen was excavated and other larger isolated bone material recovered from their Forest Sandstone host. They are to be shipped to the Smithsonian for CAT scanning and preparation. Emphasis was placed on mapping the tectonic and sedimentary settings at both Chitake and the Ntumbe footprint locality, and with the collection of sandstone specimens for SHRIMP U/Pb determinations on detrital zircons, progress was made towards palaeoenvironmental assessments. Eric Roberts is to join Paul Dirks and Tom Blenkinsop as part of the James Cook Team in Townsville.

Tim Broderick



Chairman's Chat

Daniel Chatora

The AGM on the 19th February went very well with a good attendance - our thanks to Gayle Hanssen and Dr. Houda Bouammar for organizing the venue and the logistics. It felt good to chat with friends, including my former Geological Survey colleagues Ellah Muchemwa and Sydney Simango, and to welcome Dr. Tony Martin as our latest Honorary Member.

As the global economy comes out of its deepest downturn since World War II, albeit with substantial growth variations across and within regions, one of the important factors supporting these recoveries is growth stimulating policies. In Zimbabwe the much anticipated improvement in exploration and production in the mining sector has not taken off as yet. Finance authorities are revising growth forecasts downwards from 7.7% to 4.8%, blaming the slowdown in the economy on political uncertainty, which is said to have kept away foreign donor support. Government to date has only received US\$2.9 million out of the US\$810 million it expects from donors and investors this year.

On the policy front we are encouraged by statements attributed to the Ministry of Mines' Permanent Secretary who recently told a Parliamentary Portfolio Committee on Mines that they are recommending to Government a review of proposed fees for Exclusive Prospecting Orders downwards from the \$100,000 for 20,000 hectares of prospective ground set late last year. If the fees are benchmarked with our regional neighbours this will go a long way to motivate both local and external investors to unlock exploration funds. This is more so now that metal prices are firming in the market and, as a nation, we cannot afford to be left behind again to let that risk capital go elsewhere. At the Chamber of Mines AGM, the President's reassuring remarks concerning the 51% indigenisation policy of mines will also serve to alleviate the suspicions in potential investor's minds.

The month of May was eventful in respect of Society talks. On the 3rd and 17th May Dr. Eric Roberts of Southern Utah University gave an interesting talk on *Reconstructing Early Jurassic through Early Cretaceous Paleoclimates and Paleoenvironments in Central Africa* respectively in Harare and Bulawayo. The other world-class presentation on *The Discovery of a New Species of Hominid Found near Johannesburg in August 2009*, was delivered by Professor Paul Dirks in Harare on the 14th of May. The Harare talks were well attended with the Astra Business Park Auditorium running out of sitting space on both occasions, and we were glad to involve the Prehistory Society and other members of the public. Our thanks are extended to Arup (Zimbabwe) for allowing us use of their facility.

Some Society members joined the Wits University Geology Honours student's field excursion to Zimbabwe on their visit to the North-Dyke chrome district led by Prof. Allan Wilson on Sunday 30th May. The Student trip was to continue through Zimplats and Unki before proceeding to Hwange and the Victoria Falls.



Photo Credit – Lucy Broderick

Some of the Society-organized events to still look forward to this year include:

- The Geological Survey of Zimbabwe Centenary celebrations Symposium and Field Trips to the North-Dyke and to the Belingwe Greenstone Belt, starting in Harare from the 20th and extending to the 25th October. The Geological Society is closely involved in trying to help publish a new version of the 1:1 Million-scale Geological Map of Zimbabwe in time for the celebrations. The version currently in use was first published in 1977.
- A field trip to the Chiadzwa diamond fields in Marange – subject to police approval.
- A workshop on “Applied Basic Geological Skills” – August / September 2010 in collaboration with the Geological Society of South Africa.
- We also hope to attract a presentation of the Alex du Toit Memorial lecture by Prof. Spike McCarthy on his work in the Okavango region of Botswana.

We look forward to seeing all at these gatherings.

Articles and Reports

The Chairman’s Report for 2009 Delivered at the AGM on Friday 19th February, 2010

Committee members of the Geological Society of Zimbabwe; Honorary members here present; Members of the Society here present; Past Chairpersons present; Guests of honour Dr & Mrs Tony Martin; Ladies and Gentlemen.

It is a pleasure to welcome you all to this year's Annual General Meeting of the Geological Society of Zimbabwe. I would like to extend a special welcome to our members and guests coming from outside the borders of Zimbabwe.

The chairman's report, which I am about to present, is basically a reflection of the work done by your committee during the past 12 months. The report also gives general comments on the environment under which our members operated.

The 2009 Committee

Forbes Mugumbate	Chairman
Daniel Chatora	Vice Chairman / Field trips
Collins Mwatahwa	Honorary Treasurer
Gail Hanssen	Honorary Secretary / Membership
Tim Broderick	Newsletter Editor
Andrew du Toit	Summer Symposium / Website
Hillary Gumbo	Society talks / Field trips
Bornwell Mupaya	Geological Survey and Industry News
Dr Houda Bouammar	Field trips / Membership / Website
Dr Kosmas Chenjerai	Summer Symposium
Kudzai Musiwa	Summer Symposium / Society talks
Anthony Revitt	Bulawayo representative

I would like to take this opportunity to acknowledge the spirit of hard work demonstrated by my committee members. I especially would like to thank the Committee for covering me in many respects, as I have been under tremendous work-related pressure throughout the year.

Highlights in 2009

Ladies and Gentlemen, the Year 2009 marked a major change in the political climate of the country. The year started on a positive note with the formation of the Inclusive Government. This and the removal of the Zimdollar in favour of foreign currencies stabilised the political and economic environments.

To resuscitate the economy, the new government formulated the Short Term Economic Recovery Programme (STERP), a ten-months economic stabilization strategy meant to lay a foundation for comprehensive economic recovery. Several measures were put in place under STERP, one of them being liberalization in the marketing of gold. This combined with other economic developmental measures saw several large gold mines that had been closed or put on care and maintenance resuming operations.

The Ministry of Mines and Mining Development re-introduced Gold Buying Permits. These, however, raised many questions, the main one relating to the source of gold the permit holders would buy.

The year saw vigorous campaigning by government to promote investment in mining. Several investment conferences were held, the main one being the well-attended Indaba in September 2009. However, these efforts have not produced the desired results as they were not accompanied by changes in mining policy. Much of the country remains sterilised due to the proliferation of pending EPO and SG applications. The freeze on the granting of EPOs that started in 2004 remains in place. This suggests that there is virtually no exploration activities taking place in the country. The future of the mining industry is in jeopardy if this continues. As if the freeze was not enough, the Finance Act promulgated following announcements of the 2010

budget has put the last nail in the coffin of grassroots exploration in this country. The Act proposed an exploration fee of USD100 per hectare per month and a maximum EPO size of 20 000 ha. The consequences are obviously untenable and your committee wrote a letter to government advising them of the likely effects. The next committee will engage the Ministry of Mines in dialogue over the issue, but we are encouraged by the news that the Ministry is dealing with the situation.

Despite the astronomical demand for coal triggered by a global energy deficit, and the apparent huge coal resource base in this country, there is very little activity in this area. As with EPOs, no Special Grants for coal were issued. The coal areas remain clogged with application though.

Marange maintains its popular interest. Two companies have partnered the ZMDC in 50:50 joint ventures to systematically exploit the diamond deposits. The extent of mineralization in the basal conglomerate host rock of the Umkondo Group has not been assessed. Meanwhile the wrangle over ownership of part of the deposit continues.

The amendments to the Mines and Minerals Act that have been on the table for several years remain unfinished. The indigenisation of the mining industry remains the contentious issue.

Membership

The Society membership comprised 14 Honorary Members, 108 Ordinary Members, 3 Associate Members and 8 Institutional Members. The membership numbers are gradually increasing as the economy improves. The new committee should prioritise the attraction of more members.

The following are the institutional members:

- African Consolidated Resources
- Casmyn Mining (Pvt) Limited
- Duration Gold Zimbabwe
- Platinum Exploration Ventures
- Samrec Vermiculite Zimbabwe (Pvt) Limited
- Zimari Holdings
- Zimbabwe Mining Investments
- Zimbabwe Platinum Mines Limited

Following the introduction of usage of multi-currencies to the economy, the committee came up with the following fee structure for members; Ordinary Members USD10; Foreign Members USD20; Institutional Members USD100.

Affiliated Organisations

The Mennell Society - This Society was inactive in 2009.

Zimbabwe School of Mines - Allan Mashingaidze continues to represent the Society on the School of Mines Board.

Society Functions

Talks

Martin Spence gave a talk on diamonds, concentrating on De Beers' successful marketing strategies.

Professor Paul Dirks presented on the controls on gold mineralization, concentrating on the role of deep-seated structures.

Although not organised by the Society, Tim Broderick gave a talk on dinosaurs in the Zambezi Valley to a well-attended meeting of the Pre-History Society.

Field trips

One field trip was undertaken to Murowa diamond mine. Unfortunately the trip was poorly attended as it coincided with the Mining Indaba in Harare. Many lost an opportunity to see what goes on at a diamond mine. We however thank the few that attended. A report on the trip appeared in the October issue of the Newsletter. Murowa Diamond Mine is gratefully thanked for allowing the visit.

The second field trip was to the Magondi Belt as part of the Summer Symposium activities. Dr Sharad Master led the trip that was well attended. Interesting outcrops visited include some of the oldest sand dunes in the world that are found in the Deweras Group; the Highbury Meteorite Impact Structure; stromatolites near Lomagundi College; and Mhangura Mine.

Summer Symposium

The event was held on 27th November 2009 at the University of Zimbabwe's Geology Department. The well-attended symposium was different from previous ones in that in addition to the established tradition of inviting influential members of the industry to officially open the symposium, a keynote speaker of international repute was invited. Victor Gapare, the President of the Chamber of Mines officially opened the symposium while Dr Sharad Master delivered the keynote speech on the Geology of the Magondi Belt. A field trip to the Magondi Belt was undertaken on the 28th November 2009. Several good quality presentations were made. Dr Tony Martin is gratefully thanked for the onerous job of summarising the presentations, and selecting the best paper for the Keith Viewing Award. The Award will be presented tonight to Mr Hillary Gumbo, adjudged the author with the best presentation. A summary of the Summer Symposium presentations is contained in the February 2010 issue of the Newsletter.

Certification of geologists

The Society has noted that geologists, especially those in the mining industry, are not as well recognised as other mining professions because they do not have certificates of competency. There is also a worrying trend where some people who have never trained go around masquerading as geologists, taking advantage of the many potential investors seeking information on investment opportunities. This is tarnishing our noble image. These and the need to standardise the quality of geologists working in this country will make it necessary to certify and register our geologists. The Society has held discussions with the Chief Government Mining Engineer to assess the possibility of using existing structures for this purpose. The new committee will have to continue with the exercise.

Geological Survey Centennial Celebrations

The Geological Survey marks 100 years of establishment this year. The dates for the celebrations have been set for the 21st and 22nd October 2010. The Geological Society will contribute towards the celebrations by organising a symposium with the theme *A 100 years of Geological Endeavour – The Past is the Key to the Future*, and they will hold appropriate field excursions. A sub-committee chaired by Daniel Chatora has met thrice to prepare for the celebrations.

The A.E Phaup Award

The Phaup Award subcommittee comprising Dr Kosmas Chenjerai, Dr Houda Bouammar and Forbes Mugumbate has selected a paper to be presented with the award tonight.

The Mike Vinyu Award

This award, given to best final year student at the Zimbabwe School of Mines, will also be presented this evening.

Being no Geology Honours students graduating in 2009, the Geoffrey Bond Award is not presented this year.

Newsletter

Through the hard work of Tim Broderick, the Editor, the Society managed to produce three issues of the Newsletter. Thanks are extended to all contributors.

Finances

Collins Mwatahwa, the Treasurer, will present his Financial Report tonight. We wish to thank him for his professional handling the Society's finances.

Closing Remarks

I would like to take this opportunity to thank all my colleagues in the outgoing committee for a job well done. All our members who participated in Society events during the year are gratefully acknowledged.

I wish the incoming committee, led by Daniel Chatora, all the best in 2010. Please do not forget to renew your membership.

Thank you.

Citation for the A.E. Phaup Award for 2009

Presented at the 28th Annual General Meeting of the Geological Society of Zimbabwe, 19.02.2010

Good evening ladies and gentlemen. It is a pleasure that I deliver the citation for the published paper on Zimbabwe Geology that has been selected for the Society's 2009 A.E. Phaup Award.

A sub-committee comprising Dr Houda Bouammar, Dr Kosmas Chenjerai and myself considered five refereed publications covering various aspects of the geology of Zimbabwe, and independently we came up with the same paper for the award. The title of the paper published in the South African Journal of Geology is entitled *Landscape Evolution in Zimbabwe from the Permian to present, with implications for kimberlite prospecting*. The authors are A.E. Moore, F.P.D (Woody) Cotterill, T. Broderick, and D. Plowes.

The authors are not new to the geology of Zimbabwe. Andy Moore has worked in Zimbabwe in the diamond exploration sector, and has authored several papers on the development of the landscape of Zimbabwe. Tim Broderick has contributed immensely towards the understanding of the geology of Zimbabwe, having for many years worked at the Geological Survey before moving to the private sector. Woody Cotterill grew up in Shurugwi where his father, Peter, was Consulting Geologist to the chrome mines and published extensively on the greenstone belt geology and genesis of the chromite deposits. Woody is associated with the African Earth

Observatory Network (AEON) project at UCT, whilst Darell Plowes has worked as a keen observer, particularly in Manicaland, over many decades.

The paper, which resulted from comprehensive work including the integration of various data sets in GIS, remote sensing and field data, is an archive of information on the evolution of the geomorphology of Zimbabwe. The paper complements existing records on Zimbabwe landscape evolution such as the works of Dr. Linley Lister.

Whenever the geology of Zimbabwe is discussed, the aspects that come to mind are greenstone belts, granite terrains, mobile belts and gold mineralization. This paper has therefore deviated from the traditional topics, and is important in that it highlights other important areas that comprise the geology of Zimbabwe. The paper does not only have bearings on the understanding of the geology of Zimbabwe, but has strong connotations for the exploration for diamonds. Diamond is currently a topical mineral in Zimbabwe, thus this paper has been published at the right time. Through understanding the geomorphological evolution of the country, one can attempt to elucidate the provenance of kimberlite indicator minerals that are sought after in diamond exploration. This paper has therefore not only explained some of the previously unexplained kimberlitic indicator mineral anomalies, but has also postulated the likely source of the Somabhula diamonds and mentions the recently discovered palaeo-placer diamonds at Marange. The palaeo-drainage reconstruction will therefore go a long way to assist in the understanding of anomalies detected during diamond exploration.

A striking feature of the paper is the collation of detailed information that is easy to comprehend, and the numerous maps and colourful photographs help to emphasise the points raised in the text.

Congratulations to the authors for a job well done. Tim Broderick is here tonight and will receive the certificates on behalf of his co-authors.

Thank You. *Forbes Mugumbate*

Landscape Evolution in Zimbabwe from the Permian to Present, with Implications for Kimberlite Prospecting

Andy Moore, Fenton (Woody) Cotterill, Tim Broderick and Darrel Plowes

ABSTRACT

Evidence is presented to model drainage evolution across Zimbabwe since the Permian. This provides the framework to understand the marked difference in character of the rivers to the north and south of the modern central Zimbabwe watershed, which separates the Zambezi and Limpopo drainage basins. North-flowing tributaries of the Zambezi rising off this river divide have low gradients and senile characteristics. The north-west orientation of the upper sections of many of these rivers is unusual for tributaries of a major east-flowing drainage, but is in accord with the west-orientated fluvial system that deposited the Triassic sediments of the Karoo Supergroup in the Cabora Bassa basin of the Zambezi Valley. The modern drainage system to the north of the central Zimbabwe watershed is thus largely controlled by a surface that has existed since pre-Karoo times. Headwaters of the Zambezi tributaries were originally located well to the south of the modern divide, with high ground extending to the area of the present-day Chimanimani and Nyanga mountainland in eastern Zimbabwe. This drainage system persisted until the late Triassic, when rifting, linked to the early disruption of Gondwana, initiated the

formation of the modern Save and Zambezi river systems. The central Zimbabwe watershed represents a late Palaeogene (~43-33Ma) asymmetric epeirogenic flexure, part of the Kalahari-Zimbabwe Axis, which beheaded the headwaters of the early Zambezi tributaries. The resultant steeper gradients to the south of the watershed initiated the modern youthful south-flowing drainage system. A further disruption to the Zambezi drainage system occurred during Plio-Pleistocene arid episodes, when major dunes developed across dry river systems such as the Shangani, in the north-west of the country. Renewed flow in these rivers during subsequent wetter pluvial episodes resulted in them exploiting the inter-dune streets to develop new courses. Some, like the Shangani, incised their courses through the Kalahari sand cover to become superimposed drainages.

The landscape of much of Zimbabwe reflects the imprint of two major cycles of erosion (African and post-African) since the disruption of Gondwana. The African erosion cycle commenced with the disruption of Gondwana, while the ensuing post-African cycle of erosion was initiated by the late Palaeogene uplift along the line of the modern central watershed. This rejuvenated the river network, leading to removal of the carapace of deeply weathered saprolite that developed under the humid mid-Cretaceous climate of the earlier African cycle. The post-African surface is thus an etch surface, with the characteristic plain and inselberg topography marking the weathering base of the African erosion event. A very subordinate Plio-Pleistocene cycle is reflected by terraces immediately marginal to the major river systems. The confinement of the Save and Zambezi drainages to graben structures resulted in their evolution largely independently of the two major erosion cycles that moulded the landscape of the rest of the country.

The palaeo-drainage reconstruction has important implications for the dispersion of diamonds and associated pathfinder minerals from primary kimberlite sources. The Sese-Murowa kimberlites are inferred to be the primary source of hitherto unexplained alluvial diamonds in basal gravels of the Somabula Karoo outlier, located on the central Zimbabwe watershed, some 120 km to the north-west. The drainage evolution model also provides a framework to infer likely distal kimberlite sources for a number of major unexplained kimberlitic pathfinder mineral anomalies associated with the southern margin of the Kalahari Formation.

S. Afr. J. Geol., **112** (1)(March 2009), pp. 65-88.

Citation for the Mike Vinyu Award, 2009
For the most Accomplished geological Technician
At the Zimbabwe School of Mines, Bulawayo

Lloyd Chiyamuchiko will celebrate his 25th Birthday on 12th August. He is still single, and searching. In his spare time he enjoys soccer and watching TV. He comes from Nyashanu Village in Manicaland and his primary schooling was at Mpeza in Buhera. He sat for his 'O' and 'A' Level Examinations at Chegutu High School, leaving there in November 2005.

Mr Chiyamuchiko's project is entitled *Comparison of the "As Mined" grade and "in situ" grade at Portal 4 (Bimha Mine) in Ngezi*. The project was to determine how the as-mined grades and the *in situ* grades at Portal 4 are determined. He investigated the causes for variations between the two grade values and found these to be related to geological structures found within the mine, including along dykes, faults, low-angled joints, shears and sills.

Lloyd joined Zimplats in August 2007 as a general hand in the Mining Department and worked for a year and a half. Zimplats then considered him for a cadetship at the Zimbabwe School of Mines to study for the National Diploma in Mine Geology, a course he completed in November 2009.

Zimplats began mining underground in August 2002 with the sinking of the first portal. Today there are three mines operating, two at full production delivering 1.2 million tonnes of ore per annum each whilst the third is in up-ramp mode. Bimha, as it is called, will produce 2 million tonnes of ore annually by 2011. Zimplats' Ngezi Mine on the Great Dyke is situated 80 km south of Selous. Currently there are two concentrators operating, one at Ngezi and the other at Selous. Ore is trucked using 100-tonne road trains to both the Ngezi and Selous plants. It is planned to develop additional underground mines at Ngezi with the ultimate aim of producing one million ounces of platinum, with other products, annually.

Sincere thanks are expressed to his lecturers for the guidance they provided in order for Lloyd to reach this stage of his development. Thanks too go to all those who worked with him during his learnership and training period, both in the office and the field. These obviously include his classmates and work colleagues who played a fundamental role when things got tough. A great thank you goes to Lloyd's mentors at Zimplats, who afforded him the chance to train as a Geological Technician. Importantly these thanks go to Mr Sydney Simango the Geology Manager, Mr N. Nyagumbo, Senior Geologist and Miss P. Maphosa the Portal 4 Geologist, for being his cornerstones. Credit also goes to the training superintendent Mr M. Muponda for his support and advice, as well as all the Geological Technicians at Portal 4.

Lloyd's final subject results included 3 distinctions, 10 credits and a pass. Congratulations!

D. Tusai – Chief Executive Officer, Zimbabwe School of Mines, Bulawayo – February, 2010

Citation - Dr. Anthony (Tony) Martin **Honorary Member, 19th February, 2010**

Tony Martin was born on 21st July 1946 at Kamisuku in the Kivu Province of the Belgian Congo where his Dad, Henry Martin, had been sent as a geologist to recover tin for the Allied war effort. The War over, the Martin family were forgotten and, without a means of repatriation, they could only afford road and rail transport south to Southern Rhodesia where Henry brought the six-month old Anthony with his elder brother to the chrome mines of Selukwe in December 1946. The family moved to Salisbury in 1954 where Henry had been appointed Assistant Mineralogist at the Geological Survey, later succeeding N.E. Barlow as Mineralogist and he mapped the pegmatites of the Bikita Tin Field with the equally new Jim Wilson. Tony earned the nickname of 'Zombi' at St Georges College, which followed him to The University of the Witwatersrand where he read for a BSc Degree in Mining Geology between 1966 and 1970. Something must have happened in Johannesburg, for in 1971 he married Rona and brought her back to Salisbury where he joined the Geological Survey and was promptly posted to Bulawayo as Assistant Regional Geologist under Frank Tennick. Rona found a job with the Social Welfare Department in Tredgold Building, which also housed the Geological Survey amongst other departments. By all accounts the young Martins' enjoyed their stay in Bulawayo away from Head Office, whilst Tony cut his teeth on the many small working mines. During this time Tony also enjoyed his participation in the activities of the Rhodesian Schools Exploration Society, leading their geological groups to Buchwa and Doddiburn Ranch.

In 1972 Tony transferred to the Field Branch and started his first of three very stimulating field seasons mapping the northern two-thirds of the Shabani-Belingwe Greenstone Belt and surrounds, culminating in the now famous Bulletin 83. His contact with the likes of Dennis Laubscher at Shabanie Mine allowed for the elucidation of the stratigraphy into Upper and Lower Greenstones and identification of the unconformity of the former against the Shabani Gneiss basement. This attracted a hoard of academics to the area, including Sir Ron Oxborough from Oxford who introduced Euan Nisbet and Mike Bickle to the equation, the fourth partner in the Belingwe story being John Orpen who expanded his honours project around the Bend Mine into his doctorate under the guidance of Jim Wilson. There were many others around the honey pot from institutions related to Oxford, Cambridge, Leeds, Imperial College and American, Canadian and Australian universities. Preston Cloud from UCLA was on tour presenting his du Toit Memorial Lecture in 1975 when he visited Belingwe (and the Nilton Hotel) to see the unconformity, komatites and Cheshire stromatolites, all made famous in their own rights through the publication of a host of combined-author papers in prestigious journals, one of which earned the Phaup Award for 1980. There were quiet times too in some idyllic camps on the Ngezi and Mchingwe rivers, on Moorcroft's farm and elsewhere and Bridget, Tony and Rona's eldest daughter, was born in Shabani in 1975. Later the Belingwe Team staged their 'Circus' in September 1981 by inviting all and sundry from South Africa, Swaziland, the UK and elsewhere to visit their outcrops, compare the Barberton Model and argue the toss. In 1993 their Phaup Award-winning *magnum opus* on the Belingwe Belt was published by Balkema of Rotterdam, being Special Publication No.2 of the Geological Society of Zimbabwe.

Having collected a mountain of specimens with his fellow compatriots, these were shipped to Oxford, where the Martins' headed in 1976. Whilst finding time to examine some of the specimens using up-to-the-minute technology, Tony's main task was to co-ordinate the UK Heat Flow Project out of Oxford. Caroline, his second daughter was born in Scotland in May 1977. The family found time to travel, using the forerunner of the combie, and Caroline spent her first birthday in Athens.

They then returned to Salisbury in mid-1978 where Tony took up a lectureship in structural and economic geology at the University, being registered for his doctorate under Jim Wilson. He persevered until 1982, being awarded his DPhil Degree in 1984. In the meantime Tony became involved in the Geological Society at a time when it was necessary to campaign for disbandment of the Rhodesia Branch of the Geological Society of South Africa and to inaugurate the Geological Society of Zimbabwe. A referendum of Members took place and the Founder Members of our new Society became John Urie, Bob Foster, Keith Viewing, Euen Morrison and Tony Martin on 17th August 1981. Tony was in the Committee continuously from then until 1989, being Chairman twice in 1986 and 1988, serving again from 1994 to 1998. During this time he was closely involved with the organization of the Gold'82 Conference, the 5th Magmatic Sulphides Field Conference in 1987, sub-Saharan Economic Geology in 1993, the 8th International Platinum Symposium's Great Dyke Excursion in 1998, and he was Treasurer for the Intraplate Magmatism and Tectonics of southern Africa Conference in 1997 – no mean contribution.

Needs must - Tony had to branch out into the mining industry and he joined Anglo American's Prospecting Ventures under John Clutten in 1982. In 1985 he transferred to Cluff Minerals where he was closely involved with the inception of the Freda Rebecca Mine before joining Sons of Gwalia (Chase Minerals) in 1987, which was the start of his association with the Turk Mine. In 1991 Tony became consulting geologist to Zimasco when he was closely involved with the re-evaluation of Mimosa Mine. He continued consulting for these and other properties when he joined SRK Zimbabwe in 1997, becoming Managing and Principal Geologist in a thriving

enterprise that included the involvement of Alex Mikhailov, Brent Barber, Ed Matenare, Paul Dirks and others. Since then the World became his oyster and we in Zimbabwe lost sight of Tony as he operated far and wide in the DRC from Mbuji Mayi to Kolwezi and back to Lubumbashi. He flew over the untouched Frans Joseph Falls on the Congo River and his reputation took him to the alps of Kyrgyzstan and the steppes of Uzbekistan, into Mongolia and off to Liberia, Angola, Botswana and now high into the Andes of Peru. Wow! Does Tony not deserve our humble recognition as an Honorary Member of his Society. Congratulations and Welcome, Tony.

Tim Broderick

Malapa Fossil Site, Cradle of Humankind

From Wikipedia, the free encyclopedia

In March of 2008, Lee Berger of the University of the Witwatersrand undertook an exploration project in the Cradle of Humankind World Heritage Site around Sterkfontein 45 km north-west of Johannesburg, in order to map the known caves identified by him and his colleagues over the past several decades, and to place known fossil sites onto *Google Earth* so that information could be shared (Patel, 2010). The area is critical as nearly a third of the entire evidence for human origins in Africa come from just a few sites in this region, and is arguably one of the most explored areas in Africa for evidence of human origins, having been investigated continuously since the first discoveries were made there in 1935 (Dirks *et al.*, 2010).



Paul Dirks presents the findings first-hand to the Geological Society of Zimbabwe. Photo: Lucy Broderick

At the beginning of this project, there were approximately 130 known cave sites in the region and around twenty fossil deposits. By July 2008, the pattern of cave distribution seen on *Google Earth* as well as the recognition of what these deposits looked like from satellites and significant

amounts of searching on the ground had led Berger to discover almost 500 caves that scientists had not plotted or identified previously. Included in this were more than 25 fossil sites that had been unknown to science, all in probably the most explored region in Africa. Berger brought on respected geologist Paul Dirks, at that time Head of the School of GeoSciences at the University of the Witwatersrand, to lead the geological aspects of this exploratory project. In late July, Prof. Berger noted on *Google Earth* a series of caves running along a fault that pointed to a blank area in the region, an area that appeared to have clusters of trees that typically marked cave deposits. On 1st August he dropped off Prof. Dirks to map the recognized cave system and proceeded into the uninvestigated area with his dog Tau, a ridgeback who accompanied him on almost all his explorations. Almost immediately he discovered a rich fossil site that was unknown to science, in the vicinity of more than three dozen caves that had been apparently unrecognized by previous researchers (Patel, 2010). On 15th August, Prof. Berger returned to the site with his post-doctoral student, Dr. Job Kibii and his 9-year old son Matthew. Within minutes Matthew had discovered the first remains of early human ancestors - a clavicle, or collar bone. On the opposite side of the block Prof. Berger quickly discovered a jawbone with a canine tooth of a hominid. The find would soon be prepared and identified as part of a partial skeleton of a juvenile hominid, around 9 to 13 years of age (Berger *et al.*, 2010). On 4th September 2008, Berger returned to the site with more than a dozen colleagues where Berger discovered a second partial skeleton of an adult female.

The site has produced arguably one of the most complete assemblages of early human ancestors ever found, including probably the most complete skeletons of early hominids yet discovered and by far the most complete remains of any hominid dating to around 2 million years ago (Berger *et al.*, 2010). Over 130 elements have been recovered to date. The partial skeletons are initially described in two papers in the journal *Science* by Berger and his colleagues as a new species of early human ancestor called *Australopithecus sediba* (sediba meaning natural spring or well in Sotho). The species is suggested by the authors to be a good candidate for being the transitional species between the southern African ape-man *Australopithecus africanus* (the Taung Child, Mrs Ples) and either *Homo habilis* or even a direct ancestor of *Homo erectus* (Turkana boy, Java man, Peking man) (National Science Foundation, 2008). The species has long arms, like an ape, short powerful hands, a very advanced pelvis and long legs capable of striding and possibly running like a human.

The skeletons are found among the articulated skeletons of a sabre-toothed cat, antelopes and even mice and hares (Dirks *et al.*, 2010). They are preserved in hard, calcified clastic sediments that formed at the bottom of what appears to be a shallow underground lake or pool that was possibly as much as 50 metres underground at the time. It is not known how these skeletons came to be in this pool, but it appears that they may have taken a significant fall. No carnivores or scavengers reached their bodies. The Malapa hominid-bearing deposit has been dated using faunal methods and absolute methods and date to between 1.78 and 1.95 million years ago (Dirks *et al.*, 2010).

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The Committee, on behalf of the Geological Society of Zimbabwe, would like to offer a sincere vote of thanks to Marion de Beer of *Cadline* for preparing and printing our Phaup Award certificates for 2009 -- free of charge. This is, as previously, a wonderful gesture of Marion's time and skills and we can only encourage all you geologists and mining houses to steer your Autocad mapping work in her direction and to take advantage of at least 30 years of hard-won cartographic experience. *Cadline* also offers monochrome printing and scanning services in formats up to A0. Their telephone contact is 04-2917261/60 Tel/Fax is 04-301855 and the address is 94B Pendennis Road, Mount Pleasant in Harare. marion.debeer@cadline.co.zw

News



Geology Department, University of Zimbabwe

Maideyi Meck

We are pleased to announce that the Department is beginning to come to life after a very dark three years when it has been operating at its lowest ebb in its history. In January we managed to take the first intake of first-years since 2006 and a full class of 40 students are undertaking undergraduate courses in geology. The Department is currently pulling together resources for the first-year field trip to the Great Dyke and to the Bindura-Shamva Greenstone Belt. The University and the students are sharing the costs of this trip, but may I in the same vain make an appeal to industry for donations in cash or kind (food, fuel and manpower) to make the trip a success.

Most of our 2006 intake of students graduated at the beginning of the year. Twelve of them graduated with a major in geology and only two with a minor. The Department is also running repeat courses for those who failed to make it in January. There are engineering students who undertake a geology class and we have now managed to clear the backlog and are up to date in lecturing.

However, may I hasten to point out that all these positive achievements are still under threat as the staff situation in the Geology Department is still critical. This has been worsened by developments in the human resources policy of the University whereby the Graduate Teaching Assistant (GTA) post has been abolished. The Department instantly lost four GTAs. There are only three lecturers and two assistant lecturers. The lack of suitable staff is one of the main reasons the Department has failed to re-introduce any postgraduate teaching programmes. The last Master of Science in Exploration Geology intake was in 2006 and that for Honours in Geology was in 2007. These courses were

suspended due to their cost as it had become increasingly more expensive to offer them without compromise. The MSc curriculum especially included an international field trip, which could not be paid for by the candidates themselves. If there are any suggestions from members of the Society as to which programmes they could support, we are always open to discuss a strategy on how best to effectively re-introduce and implement such a programme.

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DG Direct line/Fax:	263-4-303557			

Note: DG – Department of Geology; MRC – Mineral Resources Centre; GLF – Geology Lecture Fund

Geological Survey Department



ZIMBABWE

Bornwell Mupaya

So far this year there has been no movement of staff for greener pastures. **Mr William Hahlani**, the geologist who was on a 3-month industrial attachment to Renco Mine, returned to the Department at the end of April. It is hoped that with improvement in our economy more companies will be requested to offer such attachments to some of our new geologists, thus equipping them to operate independently.

Investment meetings

The Geological Survey Department has been inundated with potential investors seeking investment opportunities in the mining industry. The majority of these were interested in coal and diamonds. Indian companies including Assar, a large iron and steel firm, were after iron ore deposits and were taken to ZISCO Steel on a familiarization tour. Also, the Director attended the Chamber of Mines Annual General Meeting where he had an opportunity to interact with members of the mining industry and to share ideas on developments in the sector.

Centennial Celebrations of the Geological Survey

The Zimbabwe Geological Survey will be celebrating 100 years of its establishment in October this year. Preparations for the event include renovations to Maufe Building and to the museum and it is intended that an updated version of the 1: 1 000 000-scale geological of Zimbabwe will be launched. The map compilation is complete, digitizing has begun and final editing of the explanation is in progress. So far several companies as well as the Ministry of Construction have inspected the building, and their quotations for the necessary renovations are expected very soon. A designer from the National Museums and Monuments has been engaged to refurbish some of the torn diagrams and disrupted exhibits in the Macgregor Museum.

Mineral Exploration

Although the progress of mineral exploration through the Exclusive Prospecting Order (EPO) and Special Grant systems is at a very low ebb, it is important to note that at least 8 new Special Grants for coal were issued in May. Now the industry awaits the finalization of EPO grants. Many companies are extending their exploration across mining claims and are re-invigorating old mines which have been at a standstill due to the harsh economic woes that came to a head in 2008. This should mean that when new EPOs are granted, renewed exploration initiatives will be generated in grassroots prospecting!

Mining Industry News

Bornwell Mupaya

1. Mining policy issues

The Ministry of Mines and Mining Development is working towards expediting issuance of exploration titles. Fees for coal Special Grants have been pegged at \$100 000 for 20 000 hectares. Discussions are underway to finalize fees for Exclusive Prospecting Orders, which were erroneously hiked to US\$100 per hectare per month in the Ministry of Finance 2010 budgetary statement.

Eight coal Special Grants were approved by the Mining Affairs Board and seven have subsequently been gazetted. The zeal for exploration in Zimbabwe has been shown by the quick response of grantee companies as most of them are already on the ground exploring and one company has already initiated drilling. This might fill in the gap in coal supplies to Zimbabwe if the Hwange dragline pit runs out in 2012 as projected.

Debate on the indigenization of the mining industry is continuing, with many viewing the 51% local shareholding as being too high. However, some consensus will be reached soon as many welcomed the President's speech at the Chamber of Mines Annual General Meeting that emphasized a policy that recognize the investment of companies in their social obligations. The Chamber of Mines recommends that the compliance period to the 51% be phased and also that listing on the Zimbabwe Stock Exchange might be encouraged and that companies might introduce employee share ownership schemes and other initiatives to ensure the equitable distribution of a stake in the wealth to more indigenous people.

2. Mineral Development

2.1 Platinum Group Metals (PGMs)

Despite several constraints such as power cuts and the loss of skilled labour, the platinum industry is growing due to a rise in platinum prices on the international market. ZIMARI

Platinum, a joint venture between the Zimbabwe Mining Development Company (ZMDC) and AMARI Resources of South Africa, is developing a US\$300 million platinum mine at Selous. ZIMARI plans to list on both the Zimbabwe and South African stock exchanges to raise capital. On a similar note, the Zimplats Board approved the proposed Ngezi Phase 2 expansion project, estimated at US\$445 million. This will result in almost double their annual platinum production, rising from 180 000 to an anticipated 270 000 ounces.

2.2 Gold

The country continues to witness a steady increase in gold production as well as development expansion on many of the old mines. Blanket Mine, like many others, expects to reach its targeted annual gold production by end of 2010 following completion of its programme to enhance the No. 4 shaft. RioZim is geared to reopen the Cam and Motor gold mine near Kadoma. With a historical gold production of 150 tonnes the Cam was the largest producing and deepest mine in the country during the 1960's. The company will start with a pilot opencast operation next year and venture into fullscale operations later.

2.3 Asbestos

Shabanie and Mashava Mines are currently under care and maintenance following viability problems. As a result, the company has failed to pay ZESA for its power usage, forcing the latter to reduce power supply to only one megawatt in order to cater for minimum activities. Hopefully a lasting solution will be found soon and fibre production will be resumed.

2.3 Diamonds

The Kimberly Process Certification Scheme monitor, Mr Chikane visited the Chiadzwa alluvial diamond fields on several occasions this year and has finally commented on improvements on the security of the diamond fields. Therefore, the country is anxiously hoping for a green light for the sale of diamonds, the proceeds from which might benefit the nation as a whole.

News about Zim Geoscientists

The Zimbabwe Institute of Management has named Goldsearch Technical Services managing director **Vimbai Chakanetsa** the 2009 Private Sector Manager of the Year. The Geological Society extends congratulations to Vimbai and to Goldsearch from all its Members.

Keith Viewing has spent a week on Stromboli where he clambered up to 320 m to watch at night the volcanic bombs falling into the ash from minor eruptions at 4 to 8 minute intervals. Others go up to 930 m to look down into the cones of which there are 4, with 8 volcanoes in the group and 16 in an extended line.

Please provide us with news about yourself or other geologists. We need to keep in touch with all of you out there. E-mail drchats@yahoo.com or makari@zol.co.zw

OBITUARY**Dr Barend (Ben) Gerrit Worst****Geological Survey, 1947-1966****Died in South Africa over the weekend of 10th-11th April, 2010**

A great and respected character, who played his part in developing the history and reputation of the Southern Rhodesia Geological Survey, has died during the Centennial year of that Zimbabwean institution. He had recently in 2008 helped celebrate 100 years of the founding of the Geology Department at the University of Pretoria, his alma mater, where he began his geological career under professors L.C. de Villiers and B.V. Lombaard in 1939. He graduated in 1941 and gained his MSc degree in 1943 when, with a group of others under Oscar Weiss, he was involved in the early geophysical programme to assess the extent of the Witwatersrand Group across the Free State goldfields beneath a Karoo cover sequence.

Ben, sensing adventure in a land of opportunity, joined the Southern Rhodesia Geological Survey in February 1947 and immediately allied with compatriots Bill Swift, William White and John Wiles in their post-War geological survey of the south-east Lowveld where consultants Sir Alexander Gibb and Partners were assessing the great development potential. Apart from routine mapping, extensive efforts were made towards the drilling and understanding of the Karoo coal occurrences in the 'Lower Sabi Coalfield' and Ben, in particular, became responsible for magnetometer surveys to elucidate the extent of magnetite deposits at Manyoka and Mongula hills. The idea was to establish an iron and steel industry in the country, and the results of this work, showing the lenticular nature of the ore and the generally poor coal quality, are embodied in the Survey's Bulletin 40 published in 1953. Ben, however, did go on to apply his geological mapping skills and geophysical expertise over the hematite deposits of Buchwa Mountain, at Redcliff in the country's midlands and across the Mwanesi Range south of Harare and he played a significant role in the initiation of Zimbabwe's iron and steel industry. Started in 1937 by Ferguson, Worst completed the regional geological mapping between Belingwe and West Nicholson in 1951. Bulletin 43 was published in 1956 and No's 53 and 54 on Buhwa and the Mwanesi Range respectively came out in 1962.

However, it was Worst's treatise on his epic mapping of the Great Dyke of Zimbabwe during the field seasons of 1951 through 1957, which gained him his lasting reputation. Encouraged by Director Ferguson and Professor Willemsse at the University of Pretoria, Ben was awarded his DSc in 1957 on the differentiation and structure of this 550 km-long layered igneous body, subsequently published in part in the Transactions of the Geological Society of South Africa for 1958 when the standard of presentation warranted the assignation *Proxime Accessit* for the Society's Jubilee Medal, won at that time by Edna Plumstead. Bulletin 47 of the Geological Survey was subsequently published in 1960 together with nine coloured map folios at a scale of 1:100,000, the length of which has graced many a stairway flank or corridor at university and institution. Although much ground has been covered in the understanding of the geology of the Great Dyke in the past 50 years, Bulletin 47 remains a classic reference, and the economy of Zimbabwe continues to rely heavily on the platinum and chromite resources of the world-renowned igneous complex that Ben Worst had made such effort to elucidate.

Subsequently, Worst's energy whilst with the Geological Survey leaned towards economic aspects. He became the Economic Geologist before his resignation in 1966 and not only was the chapter on *Chromite in the Great Dyke* published in S.H. Haughton's 1964 volumes on *The Geology of Some Ore Deposits of southern Africa*, but he wrote innumerable summaries on

mineral commodities in Zimbabwe ranging from gold, copper and platinum to limestone, lithium and diatomite.

Ben returned to his native South Africa and, when the writer met him in his General Mining office in 1980, he was still working on aspects of the Bushveld Igneous Complex, in particular its northward extension beyond Potgietersrust. He returned briefly to Zimbabwe when he presented a talk to the Geological Society and made an offer to update Bulletin 47 in his retirement. Sadly that gesture is not to be realized.

Tim Broderick

Research Funding Opportunities



GSZ Research and Development Fund

The objective of the Research and Development Fund is to give financial assistance for the development of earth science research and training in Zimbabwe. This financial assistance shall be in the form of annual Grants. Grants shall be made for activities over the course of up to one year. Those wishing to continue beyond one year must make subsequent and separate applications. The purpose of the Fund is to support:-

- Research projects on earth science topics of interest (Note that grants from the Fund will not be made to support projects which result in results that are not available to all members of the geological community in Zimbabwe);
- Scholarships for postgraduate study in earth sciences;
- Field trips and short courses for the training of Zimbabweans in earth sciences; and
- Travel to conferences to present earth science results.

In recommending the award of Grants, the following shall be considered:-

- The objective and purpose of the Fund;
- Potential benefits of the proposed activity to the geological and mining communities in Zimbabwe, in terms of development and/or the generation of new knowledge;
- The availability of matching funds, source or provided by the applicants; and
- The aim of awarding more than one Grant in a given year.

Grants made from the Fund shall be on condition that:-

- Results from the supported activity will be presented to the Society via a talk and an item or items in the Newsletter;
- Submission to the Fund Subcommittee of an annual report by 31 December of the year in which funding is granted; and
- Submission of a financial report to the Fund Subcommittee, with copies of receipts, by 31 December of the year in which funding is granted

All applicants for the award of Grants from the Fund shall be Members in good standing for the current membership year. Normally, the principal applicant should have been a member in good standing for at least twelve months.

Applicants for Grants should submit to the Research and Development Fund Subcommittee an application containing details of the applicants, summary of the activity, justification of the activity, proposed methodology, timeframe, budget for application and details of matching funds, if any. If you would like to apply for support, please contact the Research and Development Fund Subcommittee Secretary. Applications for this year should be made to the Chairman, Mr Forbes Mugumbate.



SEG Timothy Nutt Memorial Fund

Any enquiries relating to this fund can be directed through the Geological Society Committee to Judith Kinnaird, Professor of Economic Geology at the University of the Witwatersrand, who is the regional SEG representative.

Conferences

The 11th International Platinum Symposium, Sudbury, Canada – 21st – 24th June, 2010.

SEG Conference, Keystone, Colorado, USA – 2nd – 5th October, 2010.

Zimbabwe Geological Survey 100th Anniversary Symposium, Harare – 21st – 22nd October, 2010. Field trip – 23rd – 25th October.

CAG 23 - “Together in Africa for a Leading Role in Geoscience” - 23rd Colloquium of African Geology, 8-14 January, 2011, University of Johannesburg, South Africa under the auspices of the Geological Society of Africa. Scientific Sessions, Workshops, Short Courses and Field Excursions. For further details see <http://www.cag23.co.za> or e-mail cag23@uj.ac.za or hmouri@uj.ac.za

The 23rd International Geological Congress, Cape Town, South Africa – 2016.



Geological Society of Zimbabwe



A HUNDRED YEARS OF GEOLOGICAL ENDEAVOUR THE PAST IS KEY TO THE FUTURE

20th – 25th October 2010
SECOND CIRCULAR

The Zimbabwe Geological Survey celebrates its 100th anniversary this year. To commemorate the achievements of the past century, the Geological Society of Zimbabwe is hosting a symposium to encourage scientists to visit Zimbabwe to share in and contribute to the debate on those aspects of geology for which Zimbabwe is famous.

Themes include:

- Archaean granite greenstone terrain
- Layered intrusions
- Mineralization and exploration in stable cratonic environments

Developments in geological mapping

Following on from the first circular, this circular gives more specific details of the programme costs etc.

Pre-Symposium Field Excursion - 20th October 2010

Day trip to the northern part of the Great Dyke led by Prof. Allan Wilson

Depart Crowne Plaza Hotel, Harare at **7am Wednesday 20th October and return 5:30pm**

Cost - \$20, for the trip and a packed lunch.

Please let us know if you need transport and we will arrange lifts if possible. If there is sufficient requirement we may arrange a bus at a cost to be advised.

Symposium Technical Sessions - 21st & 22nd October 2010

The sessions will be held at the Crowne Plaza Hotel in Harare.

The cost of the two-day conference, including registration, teas and lunches, will be US\$75 per person if paid before the 31st August, after that the cost will be US\$100 per person.

A limited number of student discounts are available and students should apply through their department.

Accommodation at the Crowne Plaza is currently US\$80 per night (bed and breakfast). Bookings should be made direct with the Crowne Plaza email: reservations@crownep.africansun.co.zw
Telephone: +263-4-704501. The Crowne Plaza is in the centre of Harare and is in close proximity to several other hotels.

Post-Symposium Field Excursion - 23rd - 25th October 2010

Three days touring the Belingwe Greenstone Belt and the Great Dyke led by Dr Tony Martin.

Depart Crowne Plaza Hotel, Harare **7am Saturday 23rd October**

Day 1 Visit - Manjeri Unconformity; Reliance Type Section; Zeederbergs Formation, Ngezi; the Cheshire Conglomerate

Night 1 - Nilton Hotel, Zvishavane

Day 2 Visit - Mtshingwe Dyke View; Hokonui Agglomerate; Hokonui Vent Agglomerate; Chingezi Gneiss; Manjeri Unconformity West; Reliance Halls Flow; Reliance Ngezi

Night 2 - Nilton Hotel, Zvishavane

Day 3 Visit - Shabani Gneiss; Great Dyke Pyroxenite; Bougai Platinum Exploration; Shurugwi Peak View.

Return to Crowne Plaza Hotel, Harare **5pm Monday 25th October**

The cost of the three-day trip, including accommodation and meals but excluding transport, will be US\$175 per person if paid before the 31st August, after that the cost will be US\$200. Transport will be arranged, subject to a minimum requirement for 15 people, and this will cost an extra US\$150 per person and must be paid for on the 21st October.

A limited number of student discounts are available and students should apply through their

department.

Those who do not require accommodation, such as residents of Zvishavane, should contact the Secretary to find out details of the field trip itinerary and the costs that apply to them.

Bank Details

Payment can be made in cash or by transfer to:-
 Geological Society of Zimbabwe
 Barclays Bank
 Kurima House
 Harare
 Account Number 2157-6533195
 Swift Code BARCZWHX

Please send proof of payment by fax or scan so that we can reconcile payments to:- The Secretary
 Fax: +263-4-332497 Email: gsz2010conf@gmail.com

Sponsors: ***Zimplats*** ***Anglo Platinum*** ***Sandvik***

REPLY FORM

I am interested in attending the symposium to commemorate the Zimbabwe Geological Survey's 100th Anniversary in Harare, Zimbabwe, 21st & 22nd October Y / N

I would like to participate in the North Dyke field trip on 20th October Y / N

I would like to participate in the field trip from 23rd to 25th October Y / N

Title: _____

Name: _____

Address: _____

Email: _____ Tel.: _____

Special dietary requirements: _____

I would like to present a paper Y / N

Title of the paper: _____

Abstracts required not later than **16th July 2010**

Please address all inquiries, replies and other correspondence

To: The Secretary Fax: +263-4-332497 Email: gsz2010conf@gmail.com

**GEOLOGICAL SOCIETY OF ZIMBABWE:
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