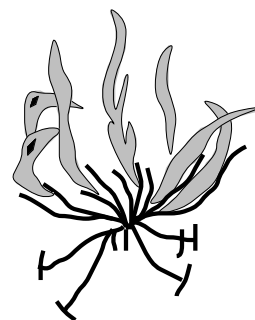

Geological Society of Zimbabwe



Newsletter



February 2007



Marange Diamond, scale ~ 8mm across

Photo credit, Martin Roberts

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Editorial

All the very best to all our Members for 2007. By all accounts we are going to need it. If we geologists can sustain the camaraderie that was displayed this year in the attendance of our functions, notably the Summer Symposium, it will go a long way towards mutual support and unity as a group. The call for this year, therefore, is to work together and for you to get involved in our own affairs with enthusiasm. Start by attending the AGM at 17.00 hrs on Friday 23rd February at Highlands Country Club. Details are on the notice you will have received. Forbes Mugumbate has kindly agreed to appraise us on the various mineral rushes that have beset our nation recently.

Contributions to this newsletter will always be welcomed. The emphasis in this issue, the last under the Chairmanship of Hillary Gumbo, is in sharing the ideas that were expressed at the Symposium. In particular, we extend our thanks to Martin Roberts and De Beers for the generous support of our Symposium shown over the past few years. His sum-up of the December event is greatly appreciated. Sadly the De Beers office in Bulawayo has since closed and Martin is now based in Gaborones. Our sincere thanks, too, are extended to our other Symposium sponsors - Anglo American, Canister Resources, Geo Associates, SMC Limited and Zimplats. Thanks too to all our contributors without whom we would not be reading this newsletter. We include in this issue an obituary for Dave Cinemon.

Now for the survival pill. The Committee announces the subscription fees for 2007. These are:

Individual and Associate Membership	Z\$20,000.00
Institutional Membership	Z\$250,000.00
Extraterritorial Membership	\$US20.00 or Rand/Pound/Euro equivalent

We look forward to your continued support this year under the Chairmanship of Kudzai Musiwa.

Tim Broderick and Nyikadzino Matura



Chairman's Chat

H.N. Gumbo

This is it, our third and final newsletter from this Committee. I hope this issue will be very interesting for our members especially those who were not at the Summer Symposium which was attended by more than 60 people!

We have a reason to look back and smile as our activities enjoyed overwhelming support from membership this year. As at 31 December 2006, membership stood at 116 ordinary, 3 associate and 16 institutional. Attendance at talks was generally +/-20 or more. I would like to thank members for their support and to encourage them to continue doing so in future.

Since the last issue in September, three more talks were held bringing the overall number of presentations to 8. All planned field trips did not take place, often cancelled at the last minute, due to reasons beyond our control. The challenge to the next Committee is to improve on the number of field trips, which should not be too difficult as only one was held by this Committee, that to Chimanimani and the Marange kimberlites. Support by our membership for future endeavours is critical.

We continued to pursue the UZ Lecture Fund project. I am pleased to announce that as a result of our presentation to the Chamber of Mines, Zimplats donated 45 computers to the Faculties of Science and Engineering. Nine of these were given to the Geology Department. Thanks to Zimplats CEO, Mr Jack Murehwa for setting the pace. Meanwhile, the Chamber of Mines has appointed a subcommittee to look into the raising of funds for not only the Geology Department, but also Mining Engineering and Metallurgy. We hope their efforts will bear fruit before the end of this year, as indeed it seems they have.

Efforts to secure funding for the 1: million geological map of Zimbabwe are still being made.

Please do remember to send us articles for our Atlas Project. These are photographs, UTM coordinates and descriptions of any interesting outcrops that you may have come across in Zimbabwe.

Yes this is our time to go, and give way to a new and energetic Committee headed by my deputy, Kudzi Musiwa. The change over will take place at our AGM to be held on 23rd February 2007 at the Highlands Country Club. All members should have received details of venue, timetable and cost by the time you receive this issue. If not, please contact myself or any member of the Committee.

I look forward to seeing you at the AGM, which will be followed by dinner and awards. We will give a full account of our activities, a very interesting talk, some very tasty dinner and ice cold beers - don't miss it!

I close by wishing you all a prosperous 2007.

Articles and Reports

Abstracts from the Geological Society of Zimbabwe's Summer Symposium held on 1st December, 2006 at the Geology Department, UZ

The Paragenesis of the Basal Conglomerates of the Umkondo

MARTIN ROBERTS

Debeers

The discovery of diamonds found within basal sediments of the Umkondo Group (~1.1 Ga) when following up a reconnaissance garnet in eastern Zimbabwe, has provoked considerable interest. It was felt that the understanding of these basal sediments could assist in understanding the primary source of the diamonds, and the understanding of the diamonds and their conglomerate host could provide insight on the development of the Umkondo basin.

The basal sediments are dominated by thin arkose and rare conglomerate that are overlain by limestone. Coarse conglomerate units are located in zones 300m-1000m wide along strike. Clasts are generally sub-rounded to well-rounded and are dominated by vein quartz pebbles. Typically rare, but locally common basement lithic clasts tend to be more angular and in places

appear to have been very locally derived. Bedding in the conglomerates is poorly developed and manifests itself by coarse planar bedding and low angle cross bedding. The conglomerates grade laterally and vertically into arkosic grits. Type localities for these basal conglomerates include the Makodzi and Kondo outcrops, which are described in detail and compared.



Basal Umkondo Conglomerate - Spot the diamond

The diamonds from the basal conglomerates at Makodzi are often fractured and broken, with the unabraded breakage surfaces suggesting that diamond breakage took place within the conglomerate during burial and subsequent exhumation. The diamonds appear to be sitting within the Makodzi conglomerate as true hydraulic equivalents. Extreme abrasion may be explained by very high diamond concentrations in a well-worked conglomerate lag that remained active for a significant period of time. Brown spots on the diamonds indicate a heating event experienced by originally irradiated diamonds. This heating is typically pegged at $\sim 500^{\circ}\text{C}$, although encasing sediments suggest a lower temperature of metamorphism/recrystallization, as seen by greenschist facies overprint. Age of basal conglomerates is probably slightly >1.1 Ga (date of syn/post Umkondo dolerites), and this long period of time may have been sufficient for green spots to revert to brown under burial conditions. Nitrogen contents and Infra Red characteristics of the Makodzi diamonds defines an almost unique population by global standard, suggesting that they are derived from the same high-nitrogen, possibly eclogitic mantle source.



$\pm 8\text{mm}$ across

A multiphase model for the tectonostratigraphy of the western margin of the Umkondo basin is presented, and is believed to account for most if not all the features observed within the basin. The basal conglomerates are modelled as having been formed at the basin margin on an initially stable craton margin. Diamond input appears to be discrete and related to direct, low-sediment content, fluvial inputs into the basin margin, with little or no longshore dispersion. Long duration wave action winnowed the conglomerates and resulted in significant rounding of the clasts including the highly concentrated diamonds at Makodzi. Diamonds appear to have been concentrated in basal-most portions of the Makodzi conglomerate due to the jiggling action in the shore environment. An initial transgression is believed to have remobilized the conglomerate as a transgressive lag that eroded local basement lithologies and incorporated these more angular clasts. This developed into a major transgression with the low sediment input maintained, resulting in the limestones overlying the basal arkoses. Sediment input subsequently increased to produce the argillaceous and arenaceous sediments, which dominate the Umkondo Group. The Umkondo Group sedimentation was concluded with a major regression and possibly uplift of the basin associated with impact of buoyant mantle material. The decompression melting of this anomalously buoyant mantle produced widespread asthenospheric melting in the spinel zone, suggesting lithospheric thickness at 1.1 Ga of ~90-100km. Melts migrated towards the surface to form dolerite sills and dykes and more rarely preserved basaltic flows that cap the Umkondo sediments.

The observed sequence of basin events that occurred during the formation of the western margin of the Umkondo basin has been incorporated into a regional tectonic model for the period of the Umkondo basin formation. The accretion of a volcanic arc terrain associated with the possible docking of Antarctica during Rhodinian assembly, may have resulted in the loading of the Zimbabwean Craton margin. This in turn produced the foreland basin in which the majority of the Umkondo sediments were deposited. The initial Umkondo basal transgression was associated with the subsidence of the foreland basin. Subsequent increase in sediment input from the Zimbabwean Craton is suggested to have been a result of the development of a fore-bulge on the Zimbabwean Craton in response to the loading of the craton margin. As the accretion of the arc terrain stalled, the rising of buoyant mantle material along the Zimbabwean Craton margin resulted in widespread melting and injection of basaltic melt.

The First Geological Results from Ruschrome's Platinum Exploraton at Darwendale

YURI TELEGIN

Ruschrome Mining (Pvt) Ltd

The Russian-Zimbabwean Joint Venture, "Ruschrome Mining (Pvt) Ltd", was established for the purpose of exploration and development of mineral resources within Zimbabwe. Since May 2006 Ruschrome has owned the group of base metal claims covering the Darwendale section or the northern portion of the Hartley mafic-ultramafic complex of the Great Dyke. PGM and base metal resources within Ruschrome's claims exceed 35 million ounces of conditional platinum. At first Ruschrome is planning exploration for open pitable ore reserves within the north-western portion of the area with subsequent development of a trial open pit and the construction of a small concentrator. Exploration drilling at Darwendale was commenced in August 2006. Drill holes located east of the MSZ outcrop intersected sulphide mineralization with the open pit depth of 20 to 50 metres. Sulphide content runs at 4 to 5% in some holes. The base of the MSZ occurs 5 to 10 metres below the base of the websterite layer. The zone dips east at a maximum of 10 to 12 degrees, which will enable both open pit and future mechanized underground ore production.

Later hydrothermal alteration and veining with chlorite, carbonate and some quartz are widespread within the exploration area. This has caused generally deeper oxidation of the MSZ, up to 35 or 40 metres, when compared to shallower weathering in the Ngezi area.

Hardrock Sources for Platinum Placers in the Urals of Russia are Related to Alaskan-Type Intrusions

YURI TELEGIN

Ruschrome Mining (Pvt) Ltd

Alaskan-type zoned ultramafic intrusions or complexes are composed of a “dunite core” surrounded by a “clinopyroxenite rim”. These complexes represent a contrasting style of platinum mineralization when compared to that found within layered intrusions. Over 99% of the platinum recovered from areas hosting Alaskan-type intrusions has been produced from alluvial placers. The world’s greatest trend of Alaskan-type intrusions lies within the 650 km-long Urals Mobile Belt. It is called the “Urals Platinum Belt” because its ultramafic intrusions represent the source of the world’s largest platinum placers. Over 15 million ounces of placer platinum have been produced in the Urals since 1824. In the late 19th and early 20th centuries the Urals contributed 95-98% of global platinum production. The only known style of platinum mineralization within Alaskan-type intrusions is of “native” platinum (Fe-Pt alloys) associated with chromite dissemination and massive chromitite “schlieren” in dunite. This is the source of platinum in the placers, but no significant hardrock platinum ore body of such style has yet been discovered. Single small chromitite occurrences were the targets for primitive small-scale platinum production. One of them was a “chromitite pipe” discovered in 1909 and mined out to the depth of 180 metres after producing about 1.0 tonne of platinum. This deposit is comparable with platinum-rich dunite pipes intruding the Eastern Bushveld Igneous Complex at Onverwacht, Driekop and Mooihoek, but no mineralization analogous to the Merensky Reef has been discovered in the Urals.

Fractures, Stresses, Weathering and Groundwater in Crystalline Rocks

RICHARD OWEN¹, ABEL MAZITI¹ AND TORLEIF DAHLIN²

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²*Engineering Geology, Lund University, Sweden.*

In a granite terrain, lineaments oriented parallel to the maximum regional compressive stress orientation exhibited the thickest regolith development, while lineaments oriented perpendicular to the maximum compressive stress show the shallowest development of weathered regolith. Low groundwater yields are common in crystalline rock terrains. The study investigates the possibility of using readily available data from satellite imagery and stress field maps to identify optimal groundwater targets based on fracture orientation. The fracture pattern was digitised from aerial imagery and the principal fracture set orientations identified. The regional stress field, estimated from global stress maps, was used to determine the stresses acting on each principal lineament orientation. Multi-electrode resistivity profiling was carried out to determine the subsurface regolith conditions associated with different lineament orientations. The results (from Gutu District) indicate that the 360° and 060° lineaments sub-parallel to the principal

compressive stress orientation (s_1) exhibit maximum development of the regolith, while 130° lineaments perpendicular to s_1 do not exhibit significant regolith development. Regolith development has been linked to groundwater condition. It is concluded that knowledge of the regional stress field and fracture set orientations can be used as an effective tool for locating potentially higher yielding boreholes in crystalline rock terrains.

Potential Impacts of Mining Alkaline Rocks on Save River Water Quality in Zimbabwe

M MECK

Department of Geology, University of Zimbabwe

Alkaline rocks (phosphate-bearing deposits in particular) of igneous origin are currently being mined in Zimbabwe. Exploitation of these deposits, which are associated with metals and non-metals, provides a potential for changing the river water quality in the surrounding areas. This activity increases metal and phosphate levels in the water, thereby endangering the beneficial use of the river. Previous work on contamination has concentrated on acidic environments where most pollutants are known to be mobile. Alkaline environments were left out on the basis that most pollutants precipitate out of the water and usually do not migrate but get deposited in the sediment. Nevertheless Malinovsky *et al* (2002) have shown that apatite mining on the Khibiny apatite–nepheline ore deposits have affected various waters near the mines through elevated concentrations of total dissolved solids and metals.

The aim and objectives of this paper are to enumerate the current and potential impacts associated with the mining of alkaline rocks on Save River water quality in Zimbabwe. Though there are several impacts associated with the mining of alkaline rocks, this paper only deals with impacts relating to water quality. The discussions in the paper are based on a preliminary study of one ring complex (Dorowa). This paper discusses the noted impacts as well as the potential impact of mining alkaline rocks in terms of phosphate (and associated pollutants) release from the sediments comprising the Save alluvium. The study will in particular analyse the potential release of phosphate and associated pollutants from the Save River through analysis of physiochemical mechanisms taking place around the alkaline ring complex.

A preliminary assessment of the water quality in the Save River downstream of Dorowa phosphate mines showed an increase in electrical conductivity, iron content, manganese content, nitrate and total hardness when compared to those results recorded before the mining operation. However, there was no notable increase in phosphate and metals except for Fe and Mn. A plausible explanation for the low phosphate in the water is that the phosphates are being incorporated in the sediments.

Phosphate is known to effectively remove metals from the surface water through the formation of metal–phosphate minerals. Thus various pollutants may be adsorbed to the sediments accumulating along the riverbed. These sediments may accumulate pollutants over long periods and act as new pollutant sources to the overlying water when phosphate desorbs from sediments due to a change in water conditions. Therefore, the sediments can act as a source of water pollution in the future. The preliminary results in the study area demonstrated sediments as a potential pollutant source associated with the mining of alkaline rocks. The paper recommends proactive measures to address the potential threat to water as well as further investigations designed to understand the waters adjacent to alkaline ring complexes.

Resource Modelling - Current Trends in Gold Deposits

V S TRASHLIEV
Consultant Geologist

A successful mining operation is a combination of understanding the geology, practical mining techniques, sound metallurgy and good management. During the last two decades the general trend has been towards large tonnage, low grade and high throughput mines. Consequently, the precision and confidence in the ore reserve estimate together with rigorous grade control has formed the foundation of a profitable operation. Sophisticated and powerful mining software packages are presently available and are used in the development of mineral resources, mine designs and scheduling, thus making the resource estimation a specialized field. The use of statistical and geostatistical analysis are now commonly applied throughout the industry. With the technological advances of the past thirty years, manual methods of reserve estimation (such as polygon and section-based grade estimation) are being replaced by more complex mathematical techniques, including variations on kriging. Despite the fact that unique geologic environments and local conditions must result in a variety of interpretations and resource estimation methods, many gold deposits throughout the world apply common techniques to estimate mineral resources. Therefore, those most commonly presented parameters and methods can be considered a standard industry approach. Those that employ novel or unusual techniques relative to the norm may be considered non-standard and require special scrutiny when validating. As each mineral deposit presents its unique geological characteristics, the careful and correct interpretation of the deposit's geologic boundaries remains the single-most important aspect of any resource estimation. This requires that the geology of the deposit be reasonably delineated allowing for its realistic interpretation. A total of 35 gold deposits worldwide were surveyed using open sources and public information posted on: www.sedar.com; www.infomine.com Presented is a summary of the modelling techniques and parameters used for predicting tonnage and grade within generally acceptable limits that are currently in use worldwide.

Microbial Prospecting for Oil and Gas - Case Studies and Implications for Zimbabwe

PAUL CHIMBODZA
Geo Associates (Pvt) Ltd

Microbial Prospecting for Oil and Gas (MPOG) is a surface exploration technology based on the detection of anomalies in microbe distribution and biochemical activity in soil samples. Microbial prospecting is a unique, stand-alone method which has proved itself effective even over complex geological reservoir conditions. Its effective application and the high level of accuracy attained is the direct result of many years of practical experience. The use of specialised microbiological techniques to detect the presence of various groups of methane-, propane- and butane-oxidising micro-organisms can reliably differentiate between prospective and non-prospective areas, as well as between oil and gas reservoirs! The process is inexpensive and, before any intensive seismic exploration is undertaken, MPOG should be carried out over the whole exploration area on the basis of a minimum of two (2) tests per square kilometre. The reservoirs detected by the MPOG microbial method have been in both sandstone and carbonate down to a maximum depth of 3,500 metres. The success rate of the MPOG microbial method of surface prospecting already exceeds 90%! International onshore and offshore case studies are sited and similar work programmes are being undertaken on Geo Associates' two Special Grants located in the Zambezi Valley and the Gonarezhou area of Zimbabwe.

Life on Mars? A Review of the Evidence

DAVID LOVE

Mars, the red planet is our nearest neighbour. Is there life? Since the earliest days of humanity, people have speculated on this planet. From the first science fiction works onwards, stories have been woven. But in the last decade, increasing amounts of real evidence have started to come in, using remote sensing, from direct sampling on the surface and the analysis of meteorites from Mars that have reached Earth. Much work has focussed on the presence and behaviour of water on Mars. The north pole of Mars today consists of layered deposits, formed due to alternation of dust and ice during the northern summer and winter respectively. However, it is clear from areological investigations (areology is the geology of Mars) that there has been running water on the planet in the past. Evidence includes rock varnish, river channels and the discovery of sedimentary sequences that show fluvial transport. Evidence from evaporites on Mars suggests the presence of a highly saline environment that is hostile to most life forms, but provides an ideal habitat for osmophilic or halophilic bacteria. Because of the low temperatures and atmospheric pressure ambient, any near surface liquid water on Mars must be a highly concentrated brine solution. This means that the most likely form of life on Mars (if any) would be the halobacteria. The most spectacular evidence has come from meteorites of Martian origin. Examination of Martian meteorites by Gibson's team at NASA has shown features, which compare favourably with the accepted criteria for terrestrial microfossils and evidence for early life on the Earth. The morphological similarities between terrestrial microfossils, biofilms, and the features found in Martian meteorites are intriguing but have not been conclusively proven. The evidence continues to come in that there probably was life on Mars, at least during its wetter past. It is not yet conclusive – but is increasingly compelling.

Summing up the Summer Symposium, Geology Department UZ 1st December, 2006

MARTIN ROBERTS

Hillary Gumbo welcomed all the attendees to the Summer Symposium and introduced the Society's distinguished guest, Jack Murehwa.

Jack then took the floor in his position as President of the Chamber of Mines and Chief Operating Manager of Zimplats and discussed the importance of geology in the mining industry. In particular, he highlighted the need for exploration and the finding of new mines, not just exploring known and current ore deposits. Jack also managed to get a few chuckles when he said that geologists need to learn to speak pure English, especially when they interact with non-geologists in the mining industry.

Collins Mwatahwa then reported on the 2006 activities of the Geological Society. This included a brief overview of the history of the GSZ. Key points for 2006 included the large increase in the number of Ordinary Member. Collins also summarized the various talks that were hosted by the GSZ together with the field trips. He emphasized the need for continued and further support for the Geology Department at UZ.

Martin Roberts discussed the paragenesis of basal conglomerates of the Umkondo Group, which host the Marange diamonds. The physical characteristics of these conglomerates together with

those of the basal sequence were described and were used to propose a geological model for the development of the sediments, as well as attempting to explain the occurrence of old rounded diamonds in the conglomerate.

Forbes Mugumbate discussed progress taking place within the Geological Survey. The focus of the talk was on a recent visit to China and the Geological Survey of China. The comparatively short history of the Geological Survey of China was discussed and this provided a fascinating insight into how much work the Chinese have done to assess their own mineral resources over the past 50 years.

Edgar Chiteka gave a talk on the Great Dyke, reviewing its main characteristics. He noted some of the interesting observations and features of the geometry of that body and discussed some of the geological models which have been used to understand the Great Dyke.

Yuri Telegin gave an overview of the work that Ruschrome has done on their ground over the Great Dyke. He summarized some of the recent drill work which has taken place and the identification of some preliminary sulphide mineralization results.

Cliff Mademutsa presented on the coarse-grained-bronzitite at Ngezi and discussed how it affects the Main Sulphide Zone and how these features can affect the mineralization and value of the deposit. It was made clear how important it is to identify such bronzitite bodies within the Dyke.

Yuri Telegin then gave a second presentation on platinum placers from the Urals of Russia. This was an opportunity for all in the Society to gain an understanding of some of the earliest worked platinum deposits in the world and he provided an insight into platinum geology from a pre-Bushveld, pre-Great Dyke era.

Oliver Maponga presented a thorough review of the Hwange Coal Deposit and its relationship with the Karoo sequence. This was a highly detailed analysis and showed how much geological information is still coming from Hwange.

Richard Owen discussed the use of regional stress mapping and its application in defining structures within the Archaean basement that are suitable for ground water pumping investigation. This was an eloquent analysis of a simple technique that can allow for a greater degree of successful ground water prospecting along linear structures. Extensional environments were identified by overlaying the regional stress field with the geometry of these structures, identified by remote sensing.

Andrew Pahwaringira discussed the importance of understanding small-scale geological hazards. He stressed the importance for the geologist to be able to identify and classify the hazards in order for successful mitigation to take place. Andrew discussed some of the mechanisms and mitigating actions associated with rock instability in the mining and construction environments.

M. Meck presented on the impact of mining alkaline rocks on the surrounding surface and ground water. This included an overview of the type of pollutants that can be released from alkaline complexes and the potential impact that this can have on waters in the surrounding areas. The talk then focused on the alkaline complexes in the Save River catchment system and she presented some preliminary results of the pollutant effect downstream of the Dorowa alkaline complex, which is being mined for phosphates.

Tenyears Gumedede gave an overview of the application of geophysics and remote sensing in exploration. Tenyears discussed traditional geophysical techniques and looked at several examples including the Chirumanzu terrain, Inyala chrome mine, the Hunters Road nickel deposit and aeromagnetic work in the vicinity of Turk Mine. Tenyears highlighted the importance of using multiple techniques to accurately define an ore deposit and explained the hazards of relying on a single technique only.

M. Meck gave her second presentation of the day where the Free Open Source Software (FOSS) was discussed. The use and availability of FOSS was critically discussed in its application to geologically useful software. This provided an opportunity for members of the Society to become aware of the various software options that are available and the ease at which these can be tested and assessed for suitability.

Vlad Trashliev reviewed the history of resource modelling of gold ore deposits and discussed the current trend moving from the polygonal method to geostatistical methods. Vlad highlighted the importance of the uniqueness of all mineral deposits and that the most important parameter and input into the resource model are the geological boundaries. Therefore, real geological knowledge is the key to all resource modelling.

Cuthbert Gambara presented a talk on the challenges in environmental management that exist within the mining sector of Zimbabwe. Much of his presentation was focused on the impact that the informal mining sector is having on the environment. Various questions were posed regarding how the industry as a whole could assist in mitigating this issue the need for co-operation and respect between the formal sector and the informal sector was discussed.

Paul Chimbodza presented on the new state-of-the-art microbial prospecting technique for oil and gas. Paul took the Society members through the history of this technique and he presented some of the successes that it has had in other parts of the world. Its simplicity and low cost in comparison to traditional prospecting methods for oil and gas were discussed. Preliminary work was outlined with regard to the Zambezi Valley. Paul emphasized the need to constantly apply new technologies to old geological problems.

David Love presented his talk on the geology (areology) of Mars and focused on the debate on whether life could have or does exist on the planet. Particular attention was drawn to the recent meteorite samples, which have polarized expert thinking recently. David looked at the fundamental building blocks of life and discussed the potential for their presence by looking at the areological fundamentals of the Martian surface.

Joseph Hwata discussed the exploration process for diamondiferous kimberlites, and progressed through the targeting, exploration, evaluation and mining phases to emphasize the need for technical excellence in order to find the proverbial diamond in the haystack. A full integration of the exploration techniques available was emphasized. Some of the new technologies, including De Beers' Bell-Zeppelin Gravity System, used in kimberlite exploration were also discussed.

As a result of the earlier interest in the diamondiferous basal conglomerates of the Umkondo Group, Martin Roberts presented a summary of the features of Marange diamonds and the implications for their genesis and post-eruption transport from a common source, probably from the west.

The Summer Symposium was concluded with a summary of the day's proceedings, which was delivered by Martin Roberts. Key points that were highlighted include:

- 1) The excellent attendance at the Summer Symposium and how the sharing of ideas on the geology of Zimbabwe continues to contribute to our understanding of this field of study.
- 2) That historical economic deposits, like Ngezi and Hwange, continue to provide us with new geological insights, and that every year we learn more about them.
- 3) The application of new technologies to solve geological problems (such as the microbial prospecting technique for oil and gas) is vital for the discovery of new ore deposits, and
- 4) That responsible and sustainable development of any new and current deposit is going to be vital for the economy and the mining industry in Zimbabwe.

News



Geology Department, University of Zimbabwe

Pride Mangeya

We are grateful to Zimplats for the donation of 10 computers to the Department. We think it is important that our students are introduced to ore modelling, GIS and remote sensing packages before they enter the industry. This will only be possible with support from corporate and individual members of the Geological Society. We look forward to continued support from you.

This year we expect to have six students on the B.Sc. Special Honours programme that is expected to start on the 26th February 2007. We would like to thank our partners in the private sector who continue to support this programme by sponsoring students. We would be grateful for assistance from members of the Geological Society in running field trips. Please feel free to contact the Programme Co-ordinator, Dr. Dennis Shoko.

This year we intend to run a module on the M.Sc. in Exploration Geology course. We are still in the process of identifying a leading International Guest Lecturer and selection of prospective students is on-going. The fees for this module will be finalised by the end of this month. For any enquiries please contact Mr Kambewa.

The staffing situation in the Department remains critical and I would not be surprised if we were to lose at least three senior members of the teaching staff by the beginning of the second semester, which starts on the 26th February 2007.

Geological Survey Department



ZIMBABWE

S. Mpindiwa

Compliments of the season from the ZGS to all Society Members.

The Directorate started the year on a busy note with mining policy issues. Of major concern are the modalities and execution of the ongoing police blitz on illegal mining activities. The Ministry is looking at ways of sustaining the clean up of illegal mining activities.

The Regional Offices have seen a hive of prospectors the whole month seeking assistance with mineral identification following the discovery of alluvial diamonds in Marange. The diamond rush is so explosive that villagers dispersed from Marange by police started pig rooting any quartz crystals, garnets etc on their way home.



Makodzi diamond rush at its height in early November 2006 – The Somme has nothing on it – The site is now effectively deserted and under the protection of a Special Grant Photo credit, Martin Roberts

This resulted in illegal mining activities in several areas in Buhera, including Kajesu, where chalcedony was mined from banks of the Save River. Surprisingly this fetched between \$10 000 and \$30 000 per stone. Magnetite crystals were mined in Chikwanda in Mberengwa and were stockpiled for sale as diamonds. At the Chishanya Ring Complex amethyst and smoky quartz were mined by 1000 - 2000 people, with quartz being sold as diamonds. Small garnet crystals and epidote were mined for sale as emeralds.

The scanning of old Bulletins has been the main activity in the Data Management Section, most of these being printed for clients.

The staffing situation has not changed. Mrs Reid completed her BSc. Honours degree.

Mining Industry News

Zimplats' Revenue Soars to US\$106m

The Herald Business, 26 January 2007

Zimbabwe Platinum Mines, the local unit of South Africa's Impala Platinum Holdings Ltd (Implats), has posted a 53 percent rise in revenue to US\$105,7 million for the half-year ending December 31, 2006. In a statement issued this week, the company attributed the impressive results to strong metal prices on the international markets. The mining giant also registered a 217 percent surge in earnings. Implats, the world's second biggest platinum producer, owns 87 percent of Australian-listed Zimplats Holdings Ltd. Zimplats said net profit attributed to equity holders soared to US\$48,8 million during the six months ending December from US\$15,4 million over the same period in 2005. The firm shipped 94 766 ounces of four platinum group metals, up slightly from 93 711 ounces previously. Operating costs rose by only 8 percent to US\$55,2 million following the firm's shift of about 50 percent of production to its new low-cost underground mine from an opencast operation. In addition, the firm posted a 17 percent rise in third-quarter metal sales while operating profit rose by 6 percent.

Sales of platinum group metals and gold for the three months to September 30 2006 increased to 52 667 Ounces from 45 164 ounces in the previous quarter. Zimplats said even though production was relatively flat, sales were higher due to metals, which were in transit at the end of the second quarter. Quarterly platinum sales were 25 990 ounces, palladium 21 460 ounces, rhodium 2 353 ounces and gold 2 864 ounces. Operating profit increased 6 percent to US\$26,8 million, but operating costs were 10 percent higher mainly due to the higher sales volumes. Zimplats, which plans to shut down opencast mining by December 2007, said development of two new underground mines "has commenced and is progressing satisfactorily". The expansion – which will increase annual platinum production to 160 000 ounces of platinum by 2010 from 90 300 ounces – would cost US\$258 million. Zimplats said it had reached an agreement with national power utility Zesa to pay for all its electricity in forex to guarantee supplies.

*Zimbabwean diamonds smuggled into Mocambique
1 February 2007*

Agencio de Informacao de Mocambique,

Maputo - The Mozambican authorities have concluded that diamonds on sale in the central province of Manica were not dug out of the Mozambican subsoil, but were smuggled illegally into the country from Zimbabwe, according to a report in the Beira daily paper "Diario de

Mocambique". Zimbabweans have been selling the diamonds, and the Manica provincial directorate of mineral resources managed to obtain some. It had them analysed at a laboratory in the Eduardo Mondlane University in Maputo, which concluded that the stones were not gems, but high value industrial diamonds. The Manica director of mineral resources, Geraldo Valoi, insisted that the diamonds had not come from his province, despite rumours of prospection for diamonds. Instead, Zimbabweans had smuggled them over the border. "We are on the ground monitoring the situation", said Valoi, "since the existence of diamonds would be of interest to the country and to the Mozambican state". The area spoken of as possibly containing diamond deposits is Rotanda, in Sussundenga District. However, access is difficult and the current rainy season makes prospection there impossible. Valoi suspected that the reason people imagine that the diamonds are Mozambican in origin is that plenty of illegal mining takes place in Manica - but usually for gold. Prospectors of various nationalities have slipped into the mountainous Chimanimani reserve where they are digging or panning for gold. So far there is no sign that a single diamond has been found in Chimanimani. The prospectors are operating completely outside of the law since no mining activity is permitted in reserves. Valoi said that the fight against illegal mining must involve close co-operation between his institution, the provincial directorate of tourism (since reserves are a responsibility of the Tourism Ministry), the police and the district administration.

Bubye accuses WDC chief of bias

The Financial Gazette, 1 February 2007

Clemence Manyukwe, Staff Reporter

Bubye Minerals has accused World Diamonds Council (WDC) chairman Eli Izakhoff, of taking a stance on the dispute between it and River Ranch Limited, which undermines the country's judiciary system. In a letter dated January 26, Bubye Minerals legal counsel, Terence Hussein, said Bubye was concerned over Izakhoff's pronouncements in correspondence to River Ranch Limited legal advisor, retired judge George Smith, to the effect that the world body was prepared to provide "guidance, advice and expertise that may help River Ranch to protect its production and its reputation." Hussein said the splashing of the contents of the letter in the state media would be seen as WDC endorsement of Bubye Minerals' forcible ejection from the diamond mine without a court order. "Your letter and stance will be seen as seriously undermining the judiciary system, which in terms of our mining laws, is the final arbiter of mining disputes. It may also be seen as an endorsement of the appropriation of a mining claim and remaining there without a court order," Hussein said. "Put simply, forcibly take a mine and thereafter the WDC will give you 'guidance, advice and expertise' and help 'protect' your production and reputation." The Attorney-General has reprimanded Mines Minister Amos Midzi for making public statements on the ownership of the mine, while the Minerals Marketing Corporation of Zimbabwe (MMCZ) has said it will not certify diamonds from the disputed mine. Hussein said this showed the mine's ownership was still disputed and was not vested in the hands of River Ranch Limited. Hussein had noted that the WDC chairman addressed his letter to "justice L.G. Smith" and added that Smith is no longer a judge but an employee of River Ranch Limited and as such his statements were an opinion and not pronouncements relating to the country's laws or the dispute.

Research Funding Opportunities



GSZ Research and Development Fund

N. Matura

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, N. Matura (nematura@science.uz.ac.zw) Applications for this year should be made by 1 May, 2007.



SEG Timothy Nutt Memorial Fund

David Love and Nyikadzino Matura

A fund in memory of Timothy Nutt has been established by the SEG Foundation at the request of his family and close friends. Tim was a prominent consulting economic geologist, a SEG Member and contributor to the Exploration Reviews pages of the SEG Newsletter. He worked extensively throughout Africa and had strong professional and emotional ties to the country of Zimbabwe. He was attacked and killed on April 12, 2003, while carrying out exploration work in Eritrea. He was 49.

In accordance with the wishes of Tim's widow, Jacquie, the fund is to provide financial support for students and young economic geologists located in Zimbabwe or in southern Africa with ties to Zimbabwe. The fund may be used to support travel to technical meetings, field trips, research grants, technical lectures, SEG student chapter activities or any other activities approved by the SEG Regional Vice President for Africa. SEG members resident in Zimbabwe will aid the Vice President in selecting recipients.

The Fund is now soliciting applications. If you would like to apply for support, please contact either Nyikadzino Matura (nematura@science.uz.ac.zw) or David Love (davidlove@science.uz.ac.zw). Applications for this year should be made by 1 May, 2007.

Society Activities

Talks Presented

Monday, 16th October, 2006
Geology Department, UZ, Harare

Mr John Flynn, Genalysis, Australia
**Modern chemical analytical methods for Au and PGEs
and an Introduction to Partial Geochemistry**

- 1) A brief introduction to a commercial laboratory
- 2) Analytical methods for Au – the options, their applications and limitations
- 3) Analytical Methods for PGEs
- 4) Introduction to Partial Digest geochemistry

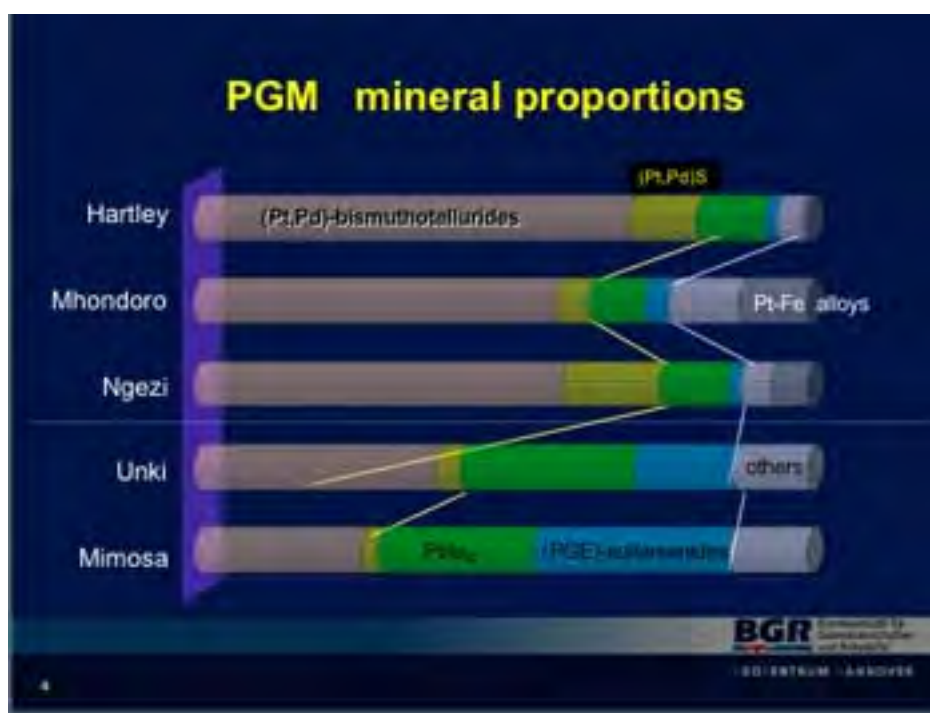
Friday 27th October

Dr Thomas Oberthur, BGR, Germany

PGE and PGM in the Supergene Environment – Oxidized Main Sulphide Zone, Great Dyke, Zimbabwe

Thomas Oberthur and Frank Melcher

One of the research projects of the BGR, Hanover involves a geological, geochemical and mineralogical study of the pristine or sulphide ores and the oxidized ores of the Main Sulphide Zone (MSZ) of the Great Dyke of Zimbabwe. Another is on the chromitites of the Ultramafic Sequence, expressed as a resource of 10 billion tonnes from 11 seams numbered downwards from C1 to C11. The PGM's of the MSZ are expressed as bismuthotellurides in the forms moncheite, maslovite, merenskyite, michenerite and kotulskite, as cooperite-braggite (PtS), sperrylite (PtAs₂), Rh-Ir-Ru-Pt sulpharsenides and as a Pt-Fe alloy. Pentlandite at Hartley contains up to 3000 ppm Pd. The mineral proportions vary between Hartley, Mhondoro and Ngezi in the Harley Complex and Unki and Mimosa in the Shurugwi and Wedza complexes as do grain sizes in polished sections. The proportion of PGE within the ores was given as Pt = 67.7%, Pd = 19.8%, Rh = 6.6%, Ru = 3.7% and Ir = 2%.



It was estimated that ±400 mt of PGE oxide ore occurs along the Great Dyke. Under 'conventional' processing only about 30% of PGE is recovered. A number of geochemical and mineralogical changes take place in the oxidized ore, the Pt/Pd ratio increasing from 1.28 to 2.43 to reflect a Pd loss and a reduction in the sulphide mineral content. The oxide mineral phases present in the sulphide zone are magnetite and chromite whilst in the completely oxidized zone there are no sulphides present and oxide minerals are represented by goethite and chromite. The PGE/PGM in the oxide ores occurs as relict PGM, relict sulphides, PGE as oxides and hydroxides replacing PGM, the total replacement or neoformation of PGM, PGE in FeOOH,

PGE in Mn-Co-OH and PGE in silicates (smectites). At Hartley the main ore minerals in the oxide zone are sperrylite, cooperite-braggite, moncheite and Pt-Fe alloy. Sperrylite (PtAs_2) represents 57.2% of the oxide PGM ore compares to it comprising only 19% of the sulphide ore mineral content. Some 80% of Pd is associated with pentlandite in the pristine ore but this element is found within smectite complexes in the oxide ore, some 50% of its original total having been removed from the system. The ratio of Pt/Pd increases to about 10 in alluvial deposits coming off the MSZ.

TJB

Obituary

Dave Cinamon 1968-2006



Dave Cinamon, who has tragically died in an accident involving a bulldozer at the Farvic Mine, was a well-respected family man and geologist. Born in Harare into a mining family, with his father and grandfather both being involved in the Penhalonga Mine, he was educated at Prince Edward School, Wits University and Natal University and was passionate about his subject -

geology. He worked for Goldfields in South Africa and in Namibia before moving back to work on the Penhalonga Mine with his family. When Casmyn Mining bought the Turk Mine he accepted a position as their consultant geologist, staying for a number of years before joining a partnership to reopen the Prince Olaf Mine at Colleen Bawn in 2003 .

The central pillars of his life were family, community and mining.

Dave met his future wife at a school retreat and they stayed together from then on, later marrying in Bulawayo. His commitment to his family was absolute and he always considered himself fortunate to have such a strong, loving and supportive bond. After his parents moved to Perth in Western Australia the family travelled regularly to visit and facilitate time for them as grand parents.

Dave had always given freely to the community, wherever he was. He crossed the traditional divide between farmer and miner, assisting in all areas of community life. During the turbulent farm invasions he never shied away from helping those in need, irrespective of their position or station in life.

Well respected in his professional capacity, Dave did some inspiring work on properties across the Gwanda Greenstone Belt. Primarily this was at the Prince Olaf where he put his practical mining ability to good use in re-opening the mine, which had been closed for 50 years. He was responsible for all underground activities and had developed a motivated and talented group of individuals into an awesome mining unit. He noticed that the hanging and foot walls both carried grade in a mineralized monzonite which had previously not been mined and this provided accessible ore to initiate the project. He also consulted for Forbes and Thompson at the Vubacikwe Mine .

I am proud to have known Dave and to have been able to call him my friend. He leaves his wife Tess, and three daughters Ali, Batya, and Dani.

Harry Greaves

**GEOLOGICAL SOCIETY OF ZIMBABWE:
CONTACT DETAILS OF MEMBERS OF THE EXECUTIVE
COMMITTEE**

NAME	PORTFOLIO	EMAIL
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Musiwa, Kudzai	Vice Chairman	kudzai@eng.uz.ac.zw
Hanssen, Gayle	Secretatary	dms@zol.co.zw
Mwatahwa, Collins	Treasurer	cmwatahwa@unki.co.zw
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Matura, Nyikadzino	Newsletter Editor	nematura@science.uz.ac.zw
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Shoko, Dennis	Society Talks	dennis_shoko@excite.com
Temba Hawadi	Geological Survey of Zimbabwe Rep	zgs@africaonline.co.zw

Institutional Membership, 2006

Anglo American Corporation Zimbabwe Limited

Blanket Mine (1983) (Private) Limited

De Beers Zimbabwe Limited

Hwange Colliery Company Limited

Minerals Marketing Corporation of Zimbabwe

Pan-African Mining (Pvt) Limited

Rio Tinto Zimbabwe Limited

Rockover Resources (Pvt) Limited

Samrec Vermiculite Zimbabwe (Pvt) Limited

SRK Consulting Zimbabwe (Pvt) Limited

Ultimate Mining and Exploration

University of Zimbabwe, Geology Department

Zimbabwe Alloys Limited

Zimbabwe Platinum Mines Limited